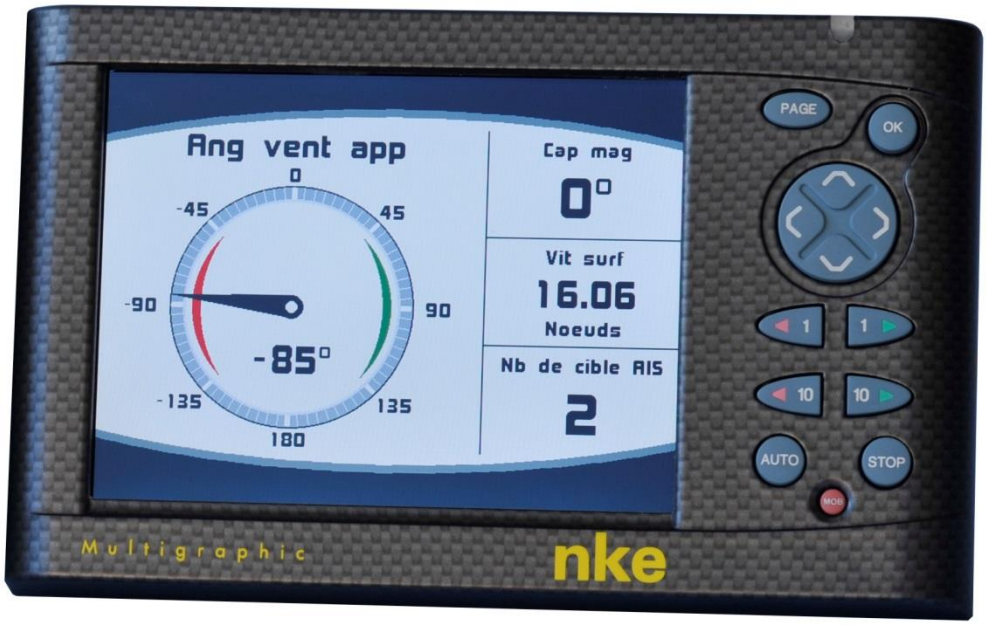
MULTIGRAPHIC

Item number: 90-60-359



USER MANUAL

&

INSTALLATION SHEET

V2.0

nke MARINE ELECTRONICS

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1 OVERVIEW

Thank you for purchasing the ***nke Multigraphic.***

The ***Multigraphic*** features a 5.7 inch colour screen. A transflective polarizer enhances daylight reading and integrated LED backlighting ensures clear readability at night. The backlight intensity can be automatically adjusted or user adjusted.

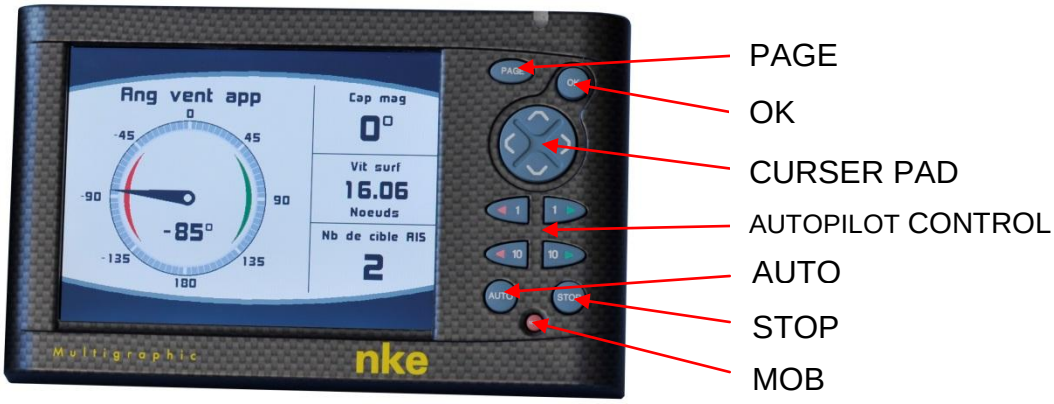
The ***Multigraphic*** is a multifunction device allowing:

- Control of the ***nke Gyropilot2*** or ***Pilote HR***
- Display of data from the sensors connected to the ***Topline*** bus in digital, analogue or graphic formats and access to setup parameters and alarms.
- Display and processing of ***A.I.S.*** target data in a 12 mile range for collision avoidance, providing there is an ***A.I.S.*** receiver connected.
- Interface to NMEA 183 devices to provide relevant data to the ***Topline*** bus.

2 OPERATION

The ***Multigraphic*** offers 10 buttons to control the display, access the menus and control the autopilot.

2.1 Key descriptions



- **PAGE**
  Successive presses will scroll through the pre-set data pages, the pilot page and the setting page.

Press and hold (at least 3 seconds) to open the Menu page.

- **OK**
  A single press confirms the current selection, or opens specific setup features on some pages.

Press and hold (at least 3 seconds) to open the settings page for backlighting, keyboard lock and stand-by mode.

- **Cursor pad**
  Use for the selection of pages and menu options.
- **Autopilot control**
  Use to control the autopilot's course in 1° or 10° increments to Port or Starboard.

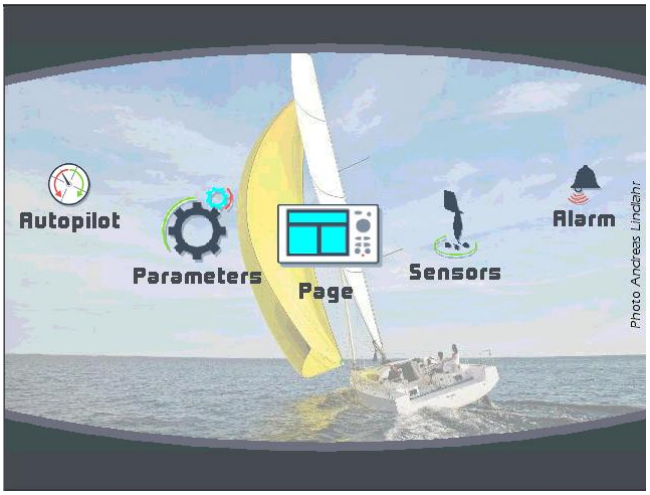
Press and hold the 10° to tack.

- **AUTO**
  Single press to engage the autopilot.

Press and hold this key to go directly to the Pilot Mode menu.

- **STOP**
  Single press to disengage the autopilot.
- **Mob**
  Press and hold to activate the man Over Board function on the ***Topline*** bus.

2.2 Menu page

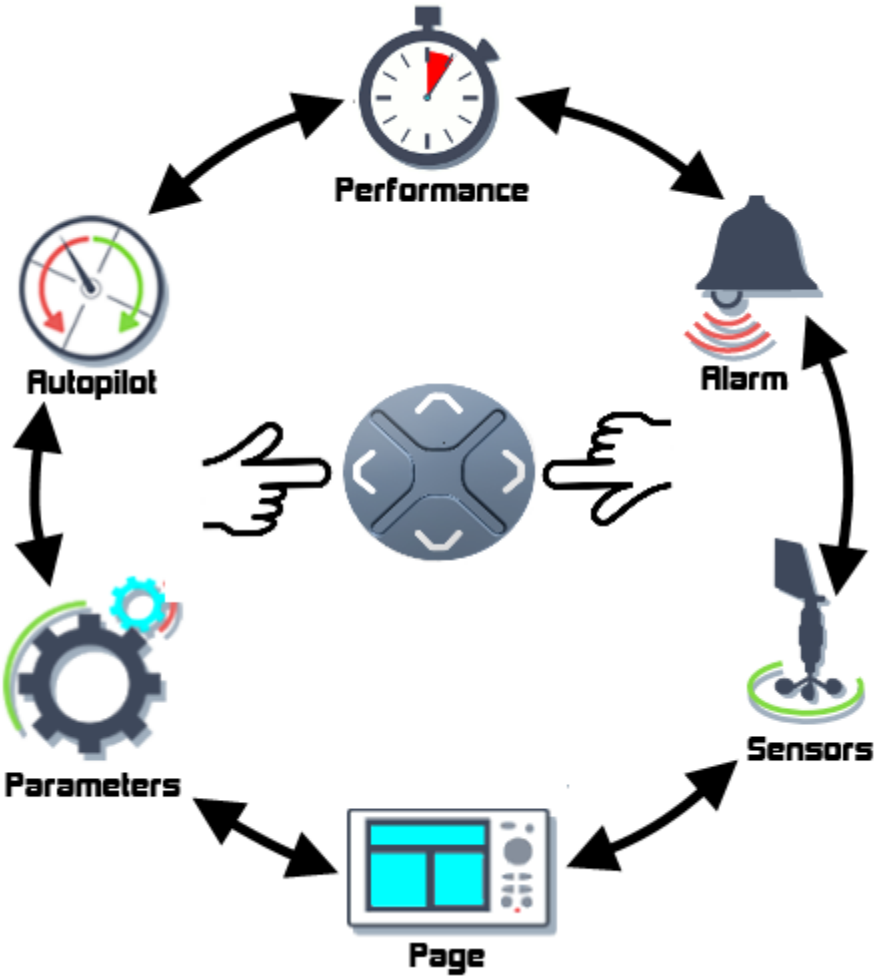


When the ***Multigraphic*** is used for the first time it displays a screen with a menu providing access to:

- the page builder function
- the sensor settings
- the alarm settings
- the pilot settings
- the Performance page setup

- the ***Multigraphic*** parameters

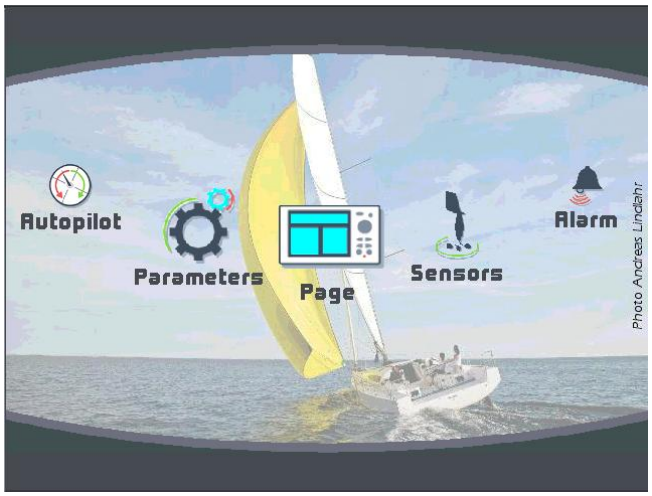
Press the cursor pad's arrows « left » and « right » to scroll through the menu icons for selection.



2.3 Page building wizard

The ***Multigraphic*** has been designed to allow the user to customise pages. 10 pages can be set up according to the user's preference with the first 5 pre-set to default settings.

To build a page, first select the « Page » icon in the menu:

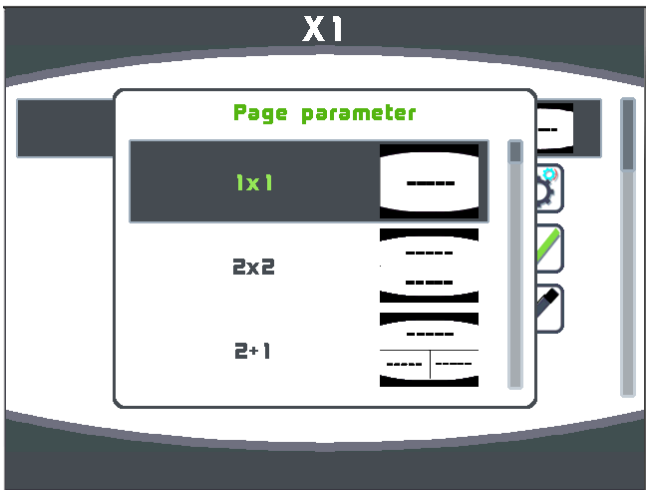


Press OK once, the following screen appears:

Select the page you want to build or edit with the up and down arrows. Empty pages are grayed out. Once you have made your selection, confirm with OK.

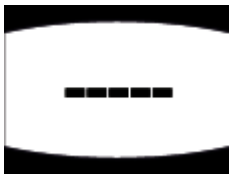
Page format

You can choose between different layouts for the page. Press OK, a list will appear.

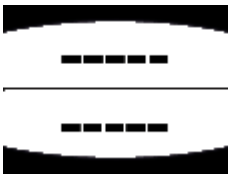


Select the screen layout template with the « up » and « down » arrows on the pad, depending on the format you wish to display on the page.

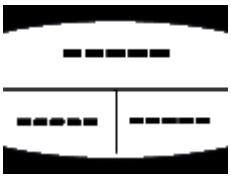
The following page layout templates are available:



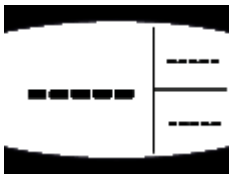
1 line



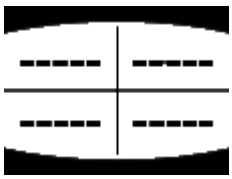
2 lines



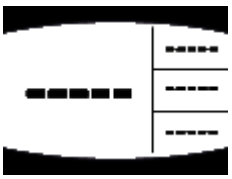
3 lines



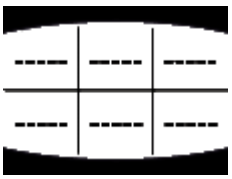
3 lines



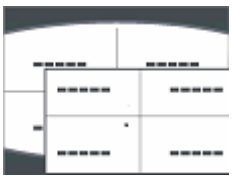
4 lines



4 lines

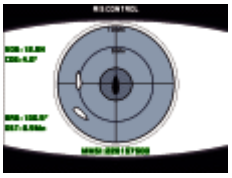


6 lines

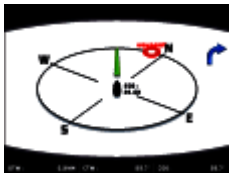


4+4 page

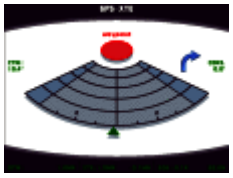
1+1 page



A.I.S. data



Waypoint page



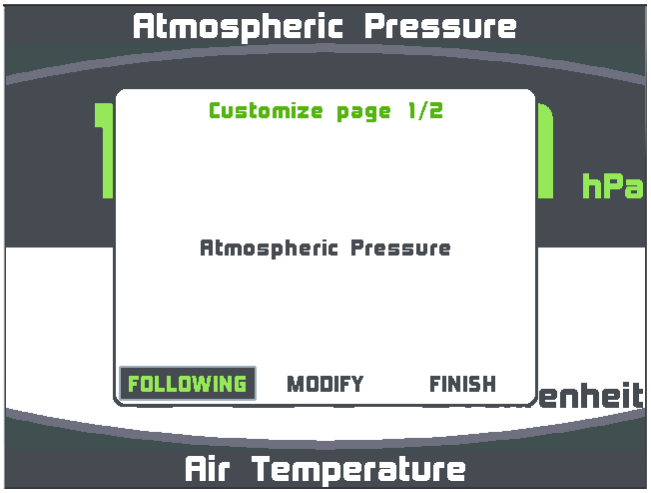
XTE page

Regatta page

Once you have made a choice, press OK to confirm.

Edit a page

This setting selects the data that will be displayed on the selected page



FOLLOWING to accept the current data in that selected part of the screen (only for multiple line pages) and go to the next page partition.

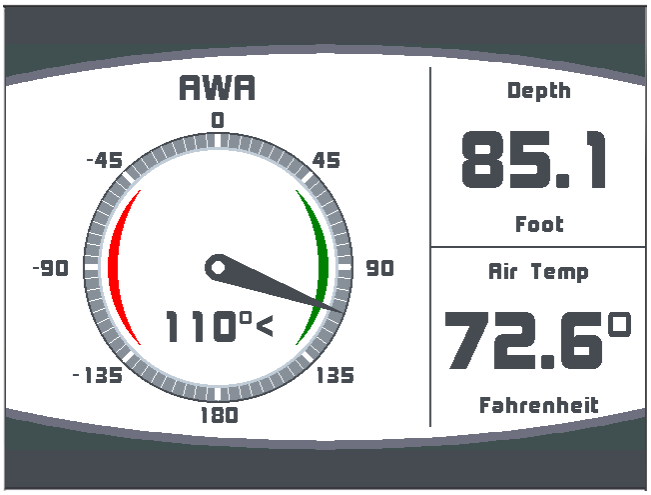
MODIFY to change the information and the colour in which it will be displayed by selecting from a list.

FINISH to accept the page and save the settings.

Note:

Some partitions of the page can display the information in analogue, graphic or digital format.

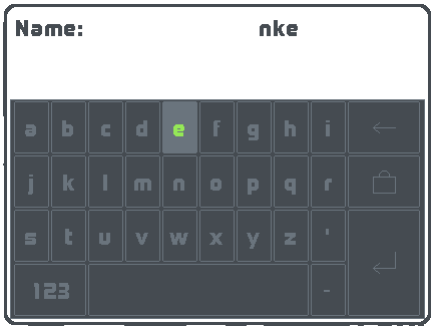
The following is an example of a page containing an analogue display:



Once the page has been built a window opens allowing you to save and rename the page.

Press « OK » to save the page.

Select Name with the pad and press the OK button to access the virtual keyboard.



Use the pad keys to select letters and press to confirm your choice. Repeat the action for each entry.

Toggle between numbers and letters.

Caps lock.

Delete last digit

Enter, to confirm the name and save the page.

Displayed

The new page is visible by default.

Press

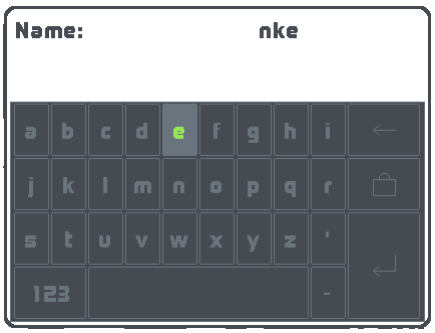
to hide the page.

Unhidden

Hidden .

Edit name

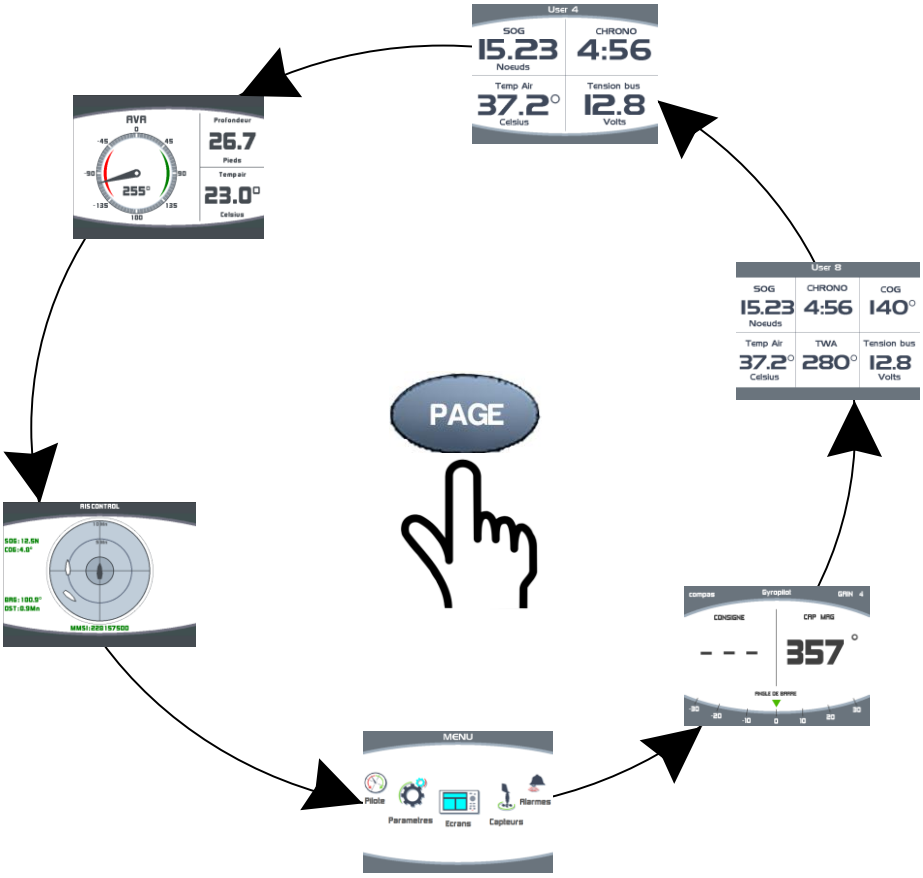
Edit the page name with the virtual keyboard.



2.4 Display pages

Scroll through the build pages, the pilot and menu pages by pressing the

button with successive presses.

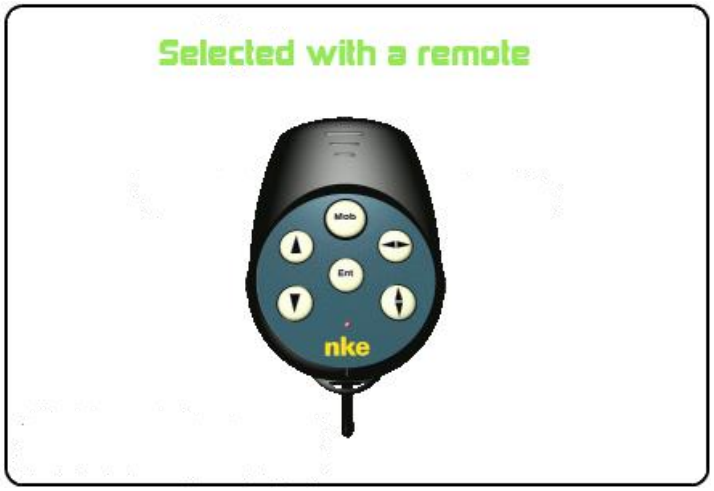


How to use the remote control

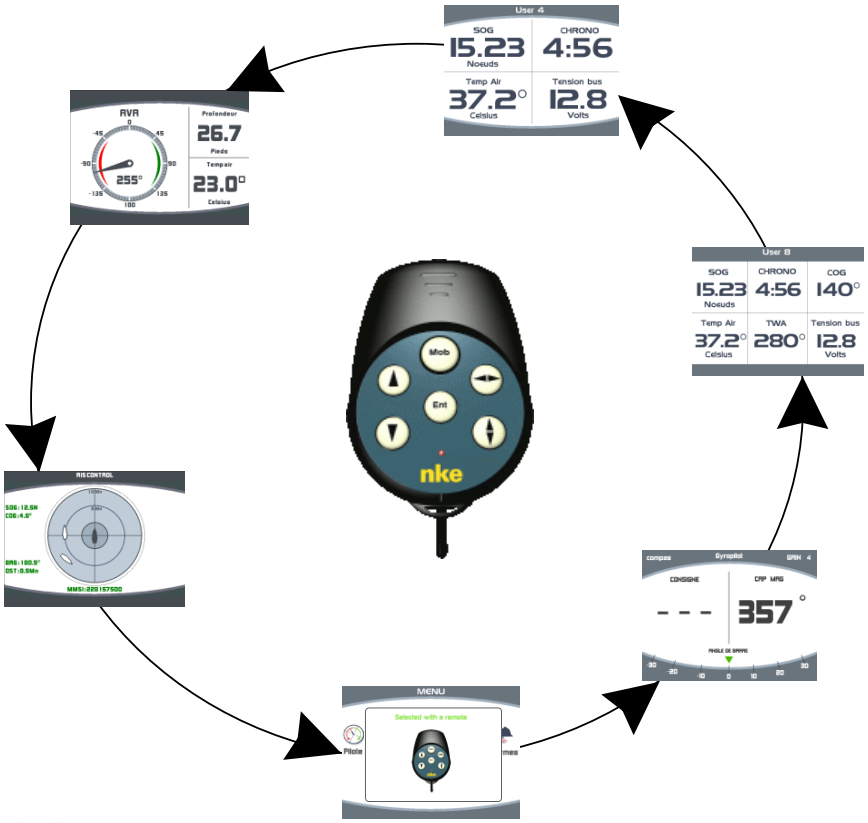
The hard wired remote control and the wireless multifunction remote control can be used to scroll through the user defined pages.

The ◀▶ key selects the Multigraphic display amongst all the displays connected to the Topline bus and the ▲▼ key calls the pages you want to display. Ent controls the timer (refer to § Race Timer).

Once the Multigraphic has been selected, the following window will appear:



The other keys on the remote control are not active except for the « MOB » key.



2.4.1 Page 4+4

This page toggles between 2 groups of 4 functions. It can also be used to display data coming from racing software via the NMEA input once it has been set up (refer to « NMEA settings »). For example, software such as ADRENA feeds the system with 8 functions depending on the race course legs and this information can be read on these pages.

2.5 Multigraphic operation with the Gyropilot 2 processor

***Gyropilot* is an automatic pilot designed to steer the boat. It is intended to assist the helmsman and should never be used without state of the art navigation equipment handled by a qualified navigator.**

Once the pilot has been engaged by the helmsman the ***Gyropilot 2 processor*** will save the current value of the relevant channel: ie. magnetic heading, wind angle or GPS course. This value becomes the reference for course to steer.

From that point the processor uses the data coming from the sensors to control the rudder using the following criteria:

- the error to the course to steer, from data coming in from the compass (compass mode) or the wind unit (wind mode).

- the boat motion delivered by the gyrometer. This sensor measures boat rotation due to the action of the rudder, the wind or the waves.

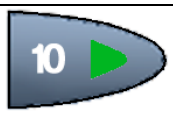
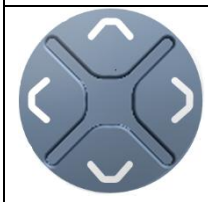
The correction value is linked to:

- The error from the course to steer,
- The gain value,
- The boat speed (the correction factor is opposite to the boat speed. i.e. with a very low boat speed the correction factor is high, and with no boat speed the ***Gyropilot*** will not perform).

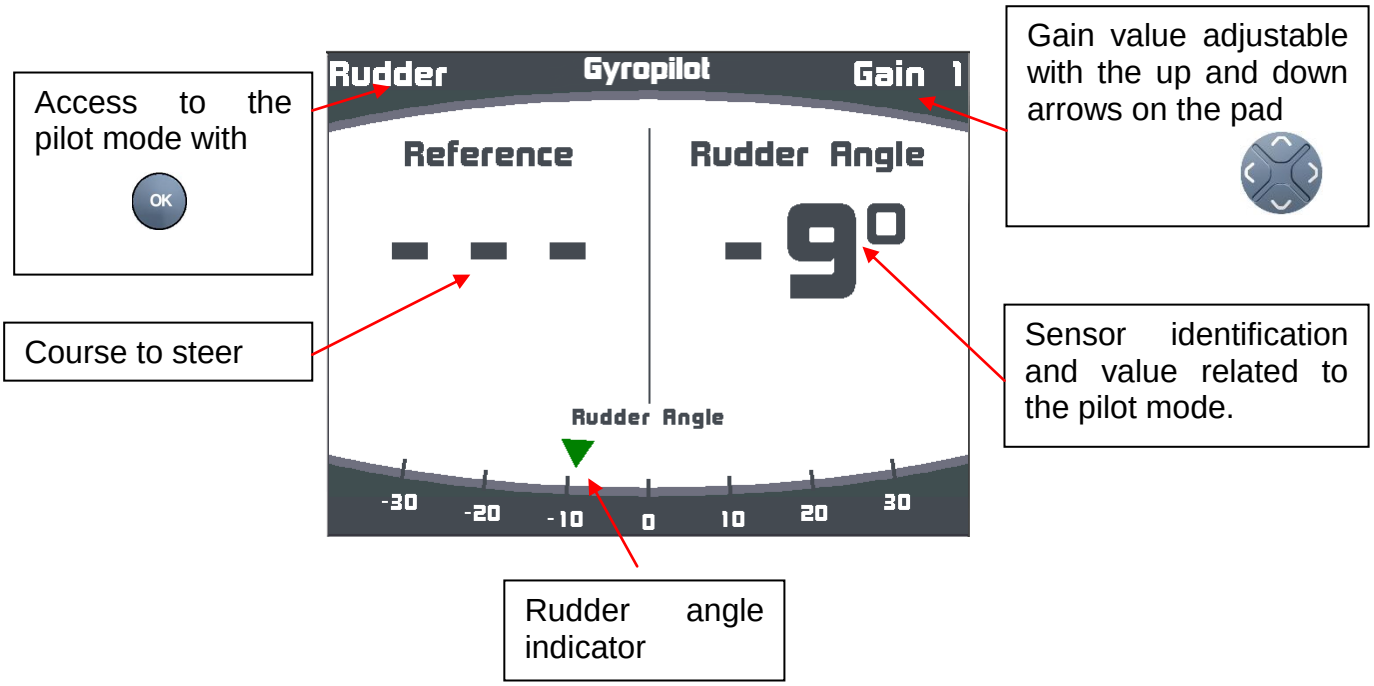
Warning:

Never leave the helm unattended. The helmsman has responsibility for keeping an efficient watch and to be ready to act in case of any event affecting the route of the boat. He must be ready to disengage the pilot and control the helm at any time.

Useful buttons for controlling of the Gyropilot

	Press once to engage the pilot on the current course relevant to the pilot mode selected. In compass mode it will be the compass heading at the time you press the button and in wind mode it will be the wind angle at the time you press the button. Press and hold this key (>3s) to go directly to the Pilot Mode menu.
	Press once to disengage the pilot and take the helm back under manual control.
	Press once to change the course to steer by +1°
	Press once to change the course to steer by -1°
	Press once to change the course to steer by +10° Press and hold for automatic tack from starboard tack or gybe from port tack.
	Press once to change the course to steer by -10° Press and hold for automatic tack from port tack or gybe from starboard tack.
	Press the up and down arrows to adjust the gain from 1 to 9 and press OK to confirm.
	Press this button for access to the pilot's mode and settings.

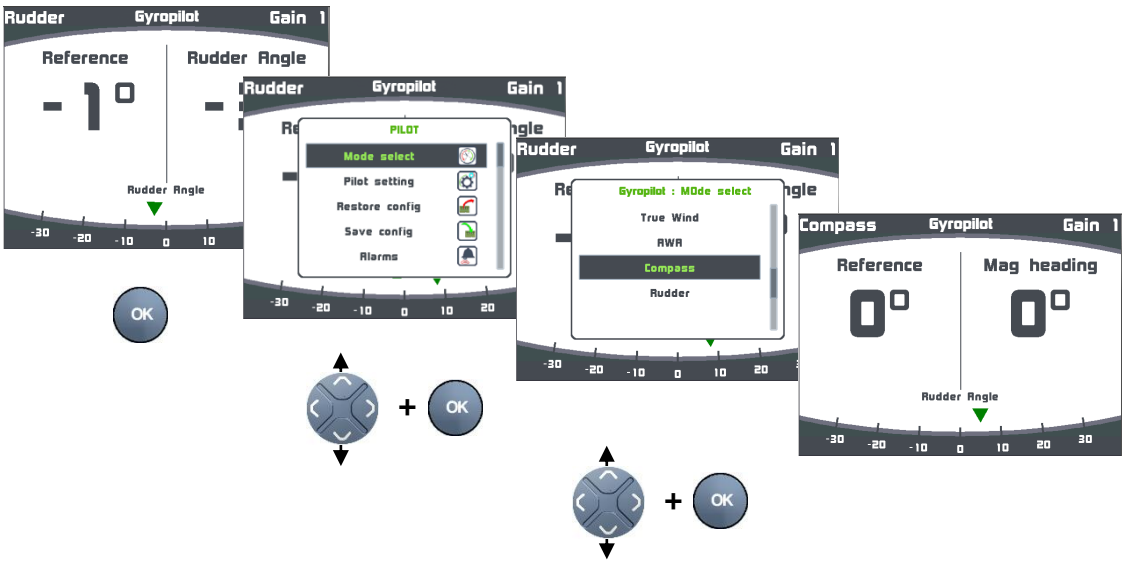
Gyropilot page



Press « OK » OK to access the pilot mode and settings. Press « page » PAGE to cancel the last action.

2.5.1 Pilot Modes

Select the pilot mode as follow:



Press and hold this key (>3s) to go directly to the Pilot Mode menu. This shortcut is available from any page

True Wind mode

This mode requires a speed sensor, a compass sensor, a wind sensor and the software add-on « true wind ». Once this mode has been selected the pilot steers the boat to a set true wind angle as calculated by the processor.

The true wind mode is particularly well adapted to downwind conditions in waves. These are the conditions where the nke pilot demonstrates its true capability. If apparent wind was used you would get the following issues:

- The boat sails down the wave and apparent wind speed increases, the apparent wind angle decreases: it is a header, the pilot bears away to maintain the wind angle it is set to steer to.
- The boat sails up the wave and apparent wind speed decreases, the apparent wind angle increases: it is a lift, the pilot luffs up to maintain the wind angle it is set to steer to.

As a result, in waves the apparent wind mode is not efficient and it is better to select the compass mode to keep a straight course.

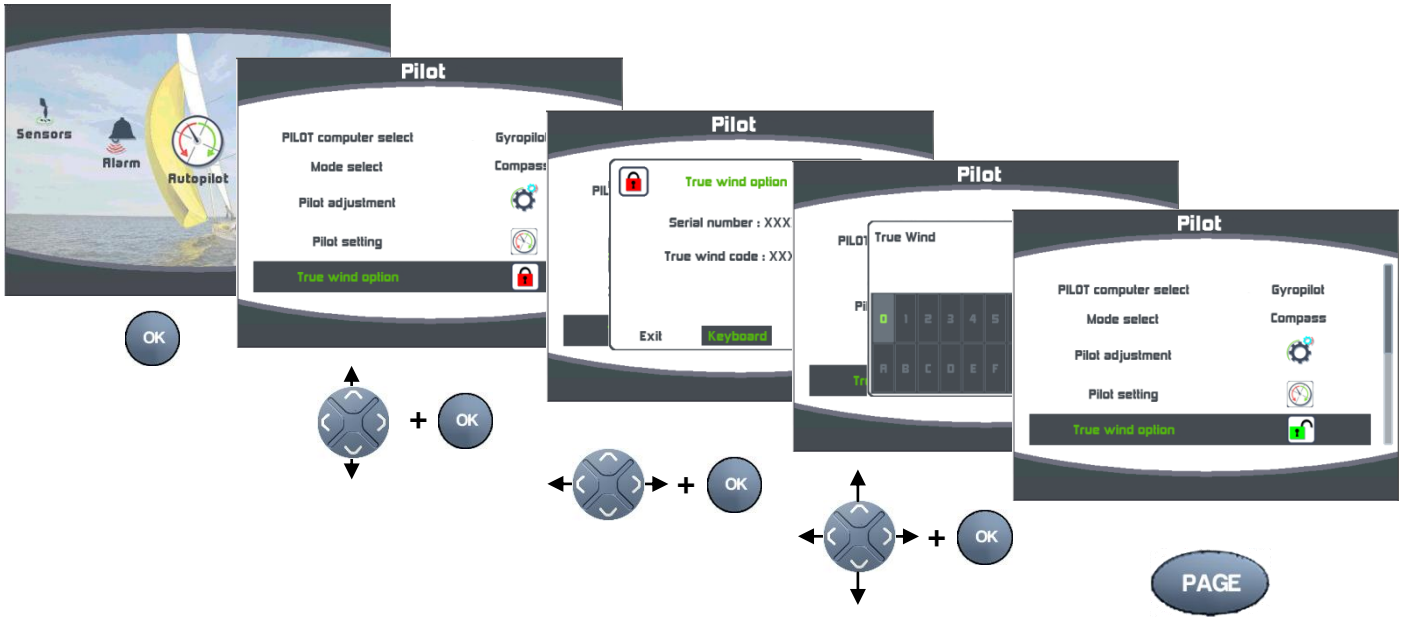
With true wind mode the pilot steers the boat on a straight course keeping the optimum wind angle in the waves. The wind angle to steer is not affected by boat speed variations. While sailing solo it is very efficient to leave the pilot to steer the boat and focus on sails trim (just watch power consumption).

True wind software add-on

A code is required to activate the *true wind mode* function. Please contact your ***nke*** dealer to get this code. The code number is linked to each ***Gyropilot 2 processor***, your dealer will need your processor's serial number to issue the code for the software add-on. This serial number can be found on a label on the processor itself or in the *true wind menu* of the ***Multigraphic.***

Activation of the true wind add-on:

The hexadecimal code is entered with the virtual keyboard. Once the function is activated the little padlock symbol will turn open and green.



Apparent wind mode

This mode requires a speed sensor, a compass sensor and a wind sensor.

With the apparent wind mode the pilot uses data from the mast head unit through the ***Topline*** bus to steer the boat on a set apparent wind angle. This mode is mainly used while sailing upwind.

Compass mode

This mode requires a speed sensor and a compass sensor.

With the compass mode the pilot uses the compass heading data from the ***Topline*** bus to steer the boat on a set heading**.**

Rudder mode

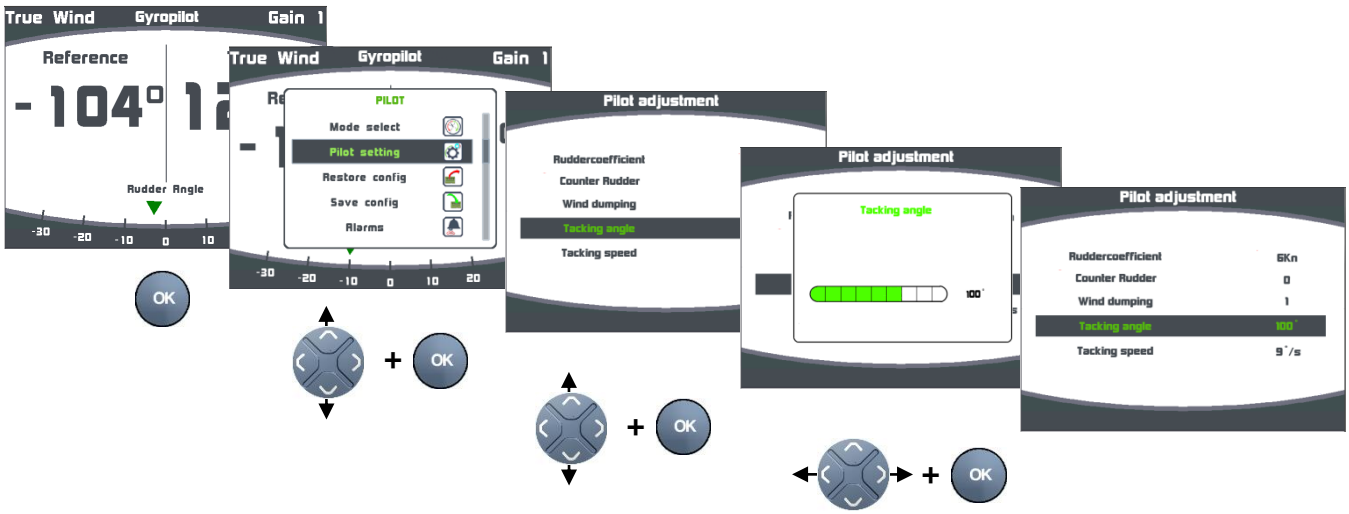
The rudder mode allows the rudder to be set at a fixed angle. The value can be between – 35° and + 35° to the mid-ship position.

Autopilot in GPS mode

In ***GPS*** mode the ***Gyropilot*** steers the boat to a route provided by the GPS or the navigation software connected to the NMEA input of your ***Topline*** system.

2.5.2 Pilot settings

Select the pilot's settings page:



Rudder coefficient

Principle: the ***Gyropilot*** processor automatically adjusts the value of the rudder angle to apply which is proportionally opposite to the boat speed. The faster the boat sails the lower the rudder angle.

This can be tuned to achieve best results by modifying the rudder coefficient between the 1 and 53 value range. The higher the value is, the greater the rudder angle proportionally to boat speed. The default setting is 6, which is valid for a 30 footer. Examples: a Figaro 2 or similar boat will require this factor to be 15, for a 60 footer it can be 20 and a multihull will be better with 30.

Note: if there is no boat speed data on the ***Topline*** bus, the ***Gyropilot*** uses SOG (Speed Over Ground) if available.

A good way to learn the effect of this value setting is to enter an extreme value, i.e. 50, and note the different behaviour of the boat before and after the setting change.

Counter rudder / gain

When you are steering you will often apply “counter rudder” by moving the rudder to the opposite direction allowing the heading to be maintained without overshoot. The pilot can be set up to control the boat in a similar way and the importance of this feature will depend on the type of boat and sea conditions. The boat rotation speed measured by the gyrometer embedded in the ***Gyropilot processor*** is used to provide this feature.

The factory default setting is ***AUTO***. This adjusts automatically with the gain. The setting value ranges from 1 to 9. The counter rudder angle is the lowest at 1.

Note that when the counter rudder setting is on AUTO, the counter rudder action is dependent on the gain setting. For a rudder gain between 1 and 3, the gyrometer is not active and there is no counter rudder. For a gain value between 4 and 9, the gyrometer is active and the counter rudder value is automatically adjusted.

Wind damping

The wind damping value adjusts the treatment of the raw data coming from the sensor and how it is used by the pilot while steering in wind mode. For example, in rough seas it is useful to increase the damping value because the mast head unit is subjected to a lot of extreme movements and the wind measurements resulting from this need to be treated differently to maintain appropriate pilot performance and sea keeping. In light wind and quiet sea conditions a low damping value will allow a finer response to changes measured optimising the performance of the pilot for the conditions. The damping value ranges from 1 to 9. The default setting is 1.

The value set to 0 means automatic wind damping. In that case the damping is linked to the wind vane oscillations with 0.5 seconds for each degree of oscillation.

Example: if the wind vane oscillation is +/-10°, the damping is **10** seconds.

Damping value	effect
L = 0	automatic
L = 1	1s
L = 2	2 s
L = 3	4s
L = 4	8 s
L = 5	16 s
L = 6	32 s
L = 7	64 s
L = 8	128 s
L = 9	256 s

Tacking angle

Set the tacking angle value for automatic tack performed by the ***Gyropilot***.

For the compass mode the tacking angle can be set between 70° and 115° (by 5° steps). The default setting is **100**°.

Tack speed

The speed at which tacks are performed by the ***Gyropilot*** can be set from 1° per second to 32° per second. The default setting is 9° per second.

Man Over Board

The Man-Over-Board function can be activated from any MOB button on a ***Topline*** display or a wireless remote control (Gyropilot, Multifonction or Crew) if the MOB function has been set.

This function works with two selectable modes: *Crew* and *Solo.*

Crew mode

This mode is selected to assist the crew for a Man-Over-Board manoeuvre. The system will not act on the rudder but activate an audible alarm and display dead reckoned bearing and distance to the MOB event.

Solo mode

If the Gyropilot is in stand-by it will automatically engage and push the rudder by + 40° or – 40°, in relation to the rudder's position at the moment the MOB function has been activated.

If the Gyropilot is activated and the system features a wind sensor, the Gyropilot switches automatically to wind mode and steers the boat up to the wind (with a 0° wind angle course to steer).

If the Gyropilot is activated and the system does not feature a wind sensor, the Gyropilot switches automatically to rudder mode and applies + 40° or – 40°, in relation to the rudder's position at the moment the MOB function has been activated.

Speed reference

If the **true wind mode** is activated the ***Gyropilot*** will use the speed over ground (if available on the ***Topline*** bus) or the boat speed through the water, at your choice.

Time out setting

This sets the time the ***Gyropilot*** can steer the boat with the gyrometer data in case of ***Topline*** bus data dropout. The setting can range from 0 to 60 seconds.

Rudder offset

This calibration sets the rudder to mid-ship position. The default setting is **0**°. It can be adjusted from –3° to +3.

2.5.3 Gyropilot operation

This section of the manual describes the use and operation of the ***MULTIGRAPHIC once*** installed and calibrated. For installation and calibration, refer to the installation section, page 70.

The default factory settings of the ***Gyropilot*** will perform well on most boats.

To power your system on use the general switch panel where two separate 12 V power supplies are installed for:

- The power drive and the processor (refer to the installation guide of the ***Gyropilot2***)
- The ***Topline*** bus where all sensors and displays are connected.

Warning:

Always turn the power drive and processor on **before** the ***Topline*** bus.

Operation with compass mode

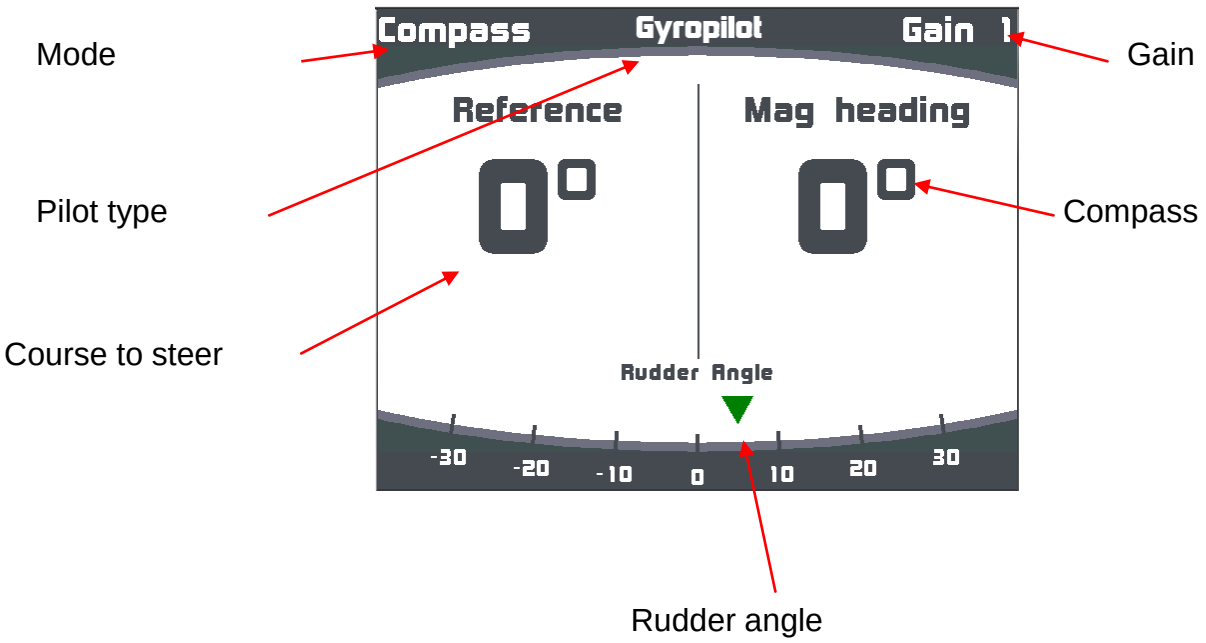
The compass mode requires a compass sensor and a boat speed sensor.

Steer the boat onto a suitable heading, allow time for the boat to settle on this course with the rudder on mid-ship position and press ***Auto*** to engage the ***Gyropilot***.

The pilot will steer to the current heading which is automatically set as course to steer.

Return to manual steering by pressing ***stop*** once when you are ready at the helm.

The following graphic shows the pilot page as it will be displayed on the ***Multigraphic*** when the ***Gyropilot*** is engaged in compass mode.



Note: when the pilot is disengaged «**---**» is displayed instead of the course to steer.

Warning:

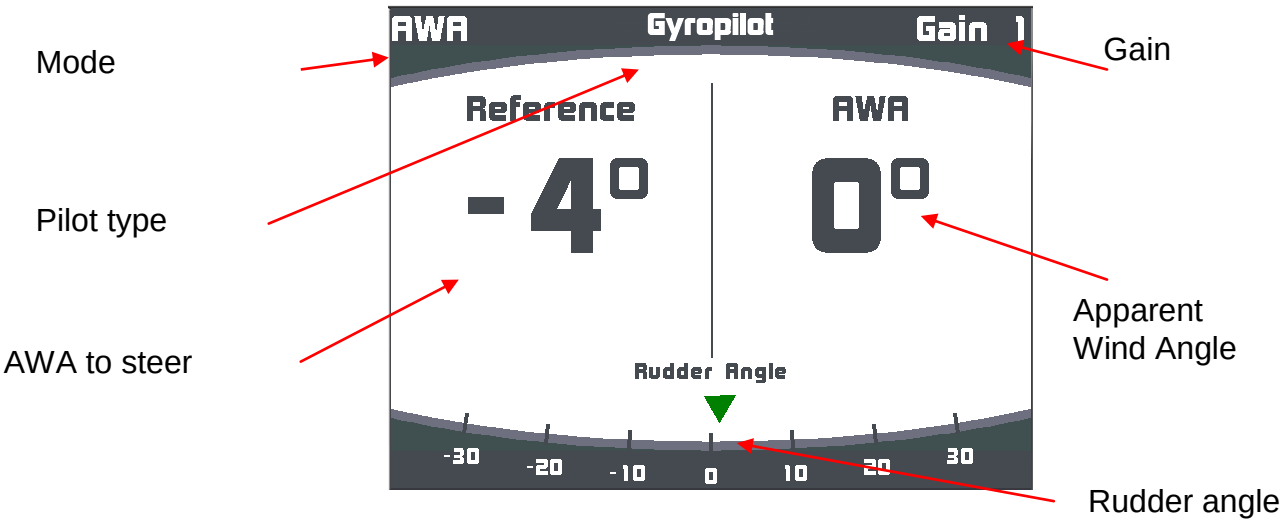
The ***Auto*** button engages the pilot and the ***Stop*** button disengages the pilot. Make sure the pilot is disengaged before turning the power supply off.

Operation with Apparent Wind mode

The compass mode requires a compass sensor, a boat speed sensor and a wind sensor.

The apparent wind mode uses data from the mast head unit made available on the ***Topline*** bus to steer the boat on a set **A**pparent **W**ind **A**ngle. This mode is mainly used while sailing upwind.

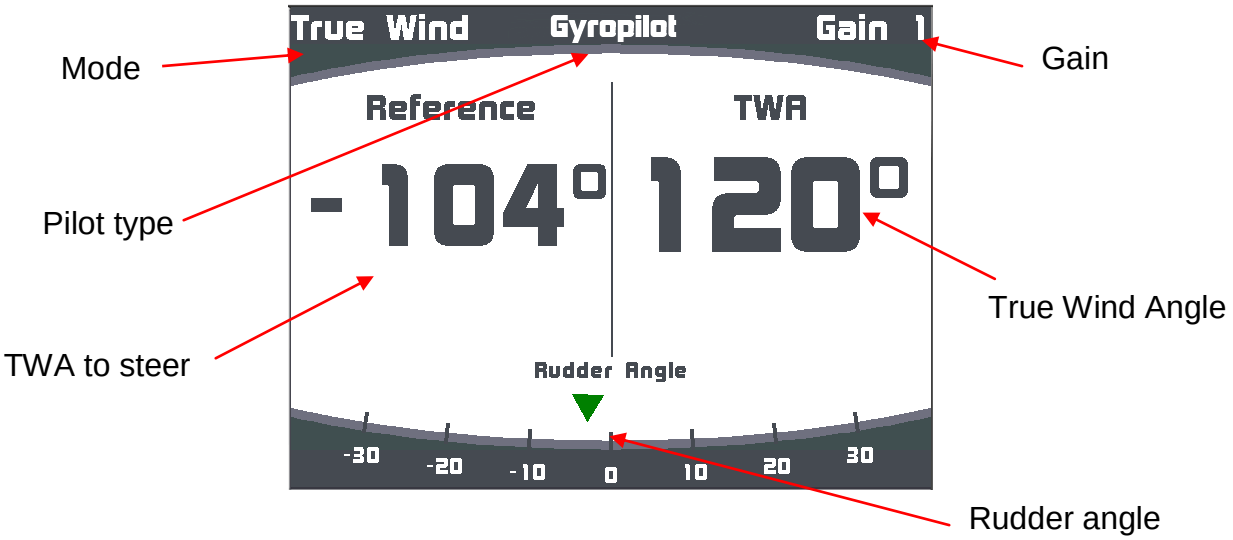
The following graphic shows the pilot page as it will be displayed on the ***Multigraphic*** when the ***Gyropilot*** is engaged in Apparent Wind mode.



Operation with True Wind mode (See § "True wind mode")

This mode requires a speed sensor, a compass sensor, a wind sensor and the software add-on « true wind ». Once this mode has been selected the pilot steers the boat to a set true wind angle calculated by the Gyropilot processor.

The following graphic shows the pilot page as it will be displayed on the ***Multigraphic*** when the ***Gyropilot*** is engaged in True Wind mode

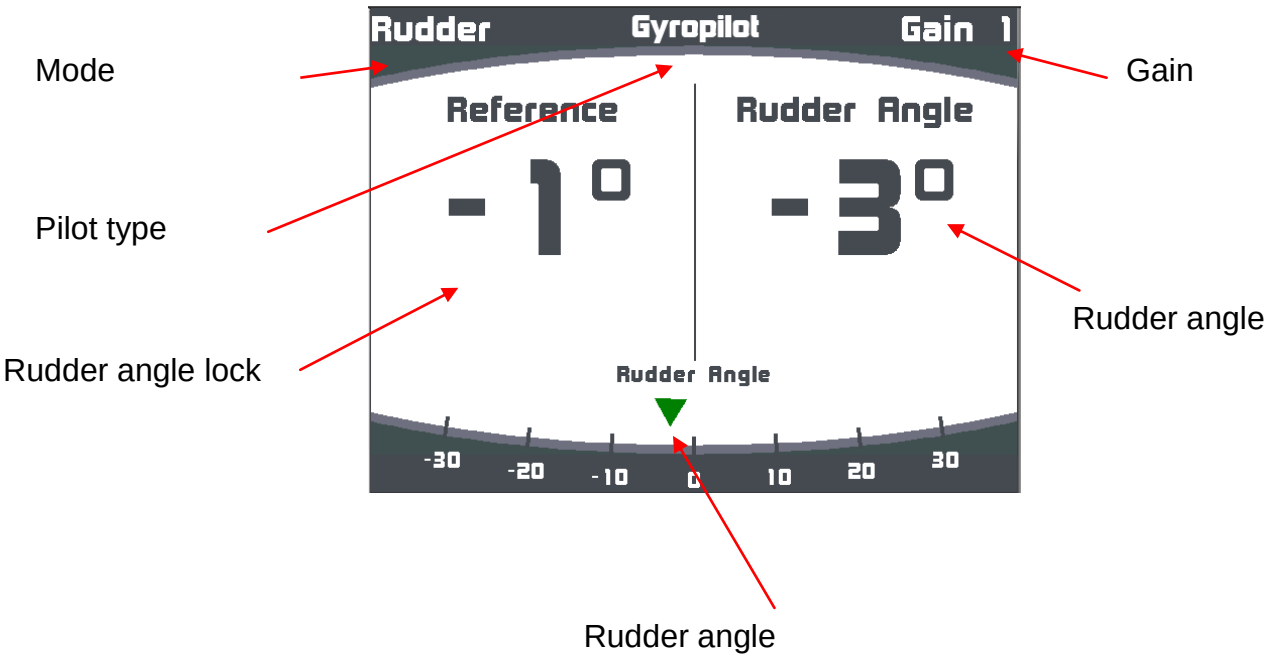


Operation in Rudder mode

The rudder mode allows the rudder to be set at a fixed angle. The value can be between – 35° and + 35° to the mid-ship position.

This mode can be used to check the drive unit or just to lock the rudder in a given position.

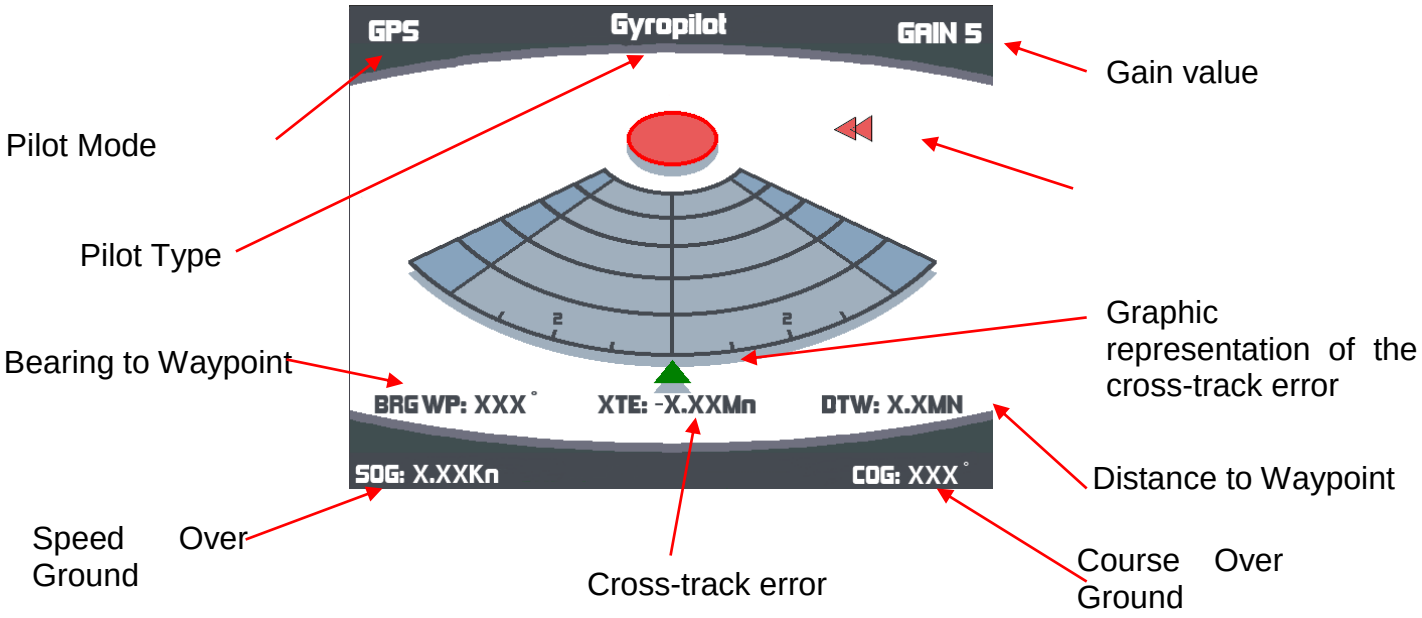
The following graphic shows the pilot page as it will be displayed on the ***Multigraphic*** when the ***Gyropilot*** is engaged in Rudder mode



Using the GPS mode

In ***GPS*** mode the ***Gyropilot*** steers the boat to a route provided by the GPS or the navigation software connected to the NMEA input of your ***Topline*** system.
To achieve this, the GPS or the navigation software must feed the system with the following NMEA sentences:

- **$xxXTE** : cross-track error and
- **$xxBWC** : bearing and distance to waypoint (DTW and BTW) or
- **$xxRMB** : XTE, latitude, longitude and bearing and distance to waypoint (DTW and BTW as minimum data).



WARNING:

Make sure your position is as close as possible to the route before engaging the pilot. When Cross-track Error is greater than 0.4 nm, the Gyropilot will apply a 45° angle to the route bearing.

When reaching the WAYPOINT the pilot triggers an audible alarm, keeps the compass heading and quits the GPS mode. The skipper must check that the route is safe and that the bearing to the next WAYPOINT is correct before pressing AUTO to resume the GPS mode. This has to be repeated for every WAYPOINT.

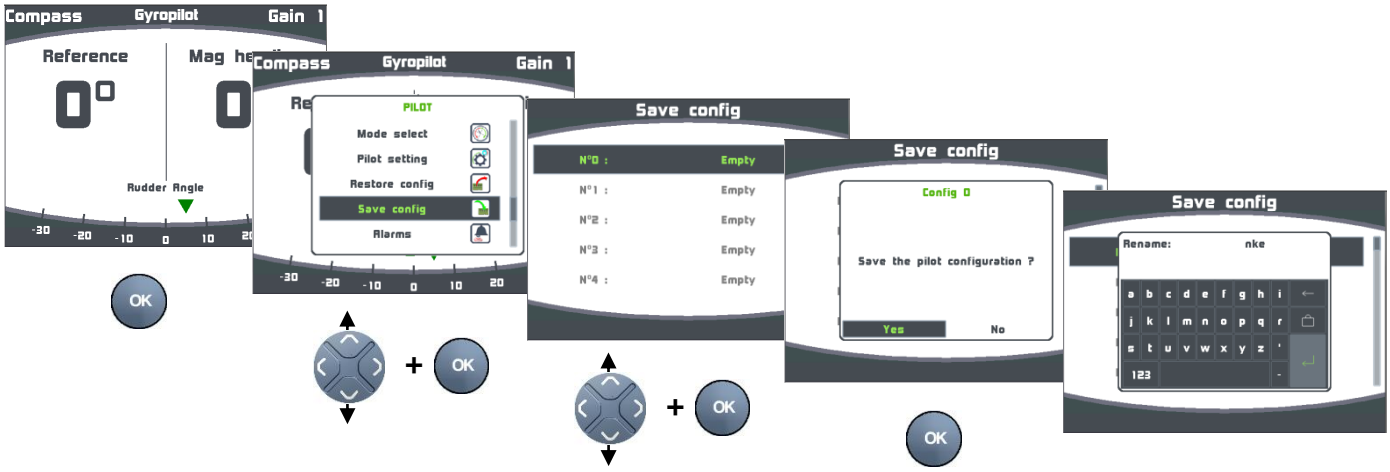
WARNING:

Your GPS or navigation software which is connected to the pilot may be able to activate the next waypoint automatically. In that case the pilot will follow the route's legs accordingly.

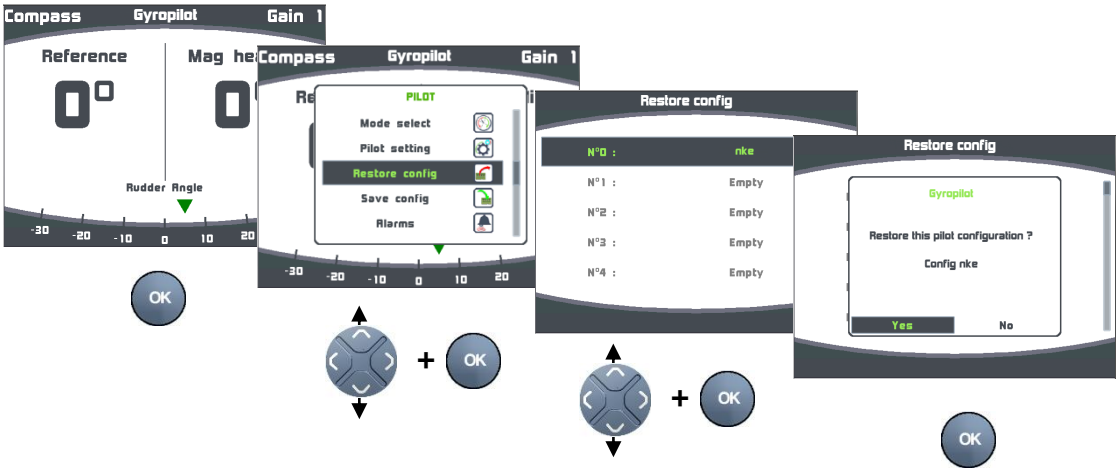
2.5.4 Pilot setup saving and recall

Up to 10 pilot setups can be saved and used at any time. For example, you can save a setup for upwind conditions and another one for downwind.

Saving a pilot setup:



Recall a pilot setup:



2.5.5 Pilot alarm

You can set two different alarms. One is for wind direction variation and another one for low voltage.

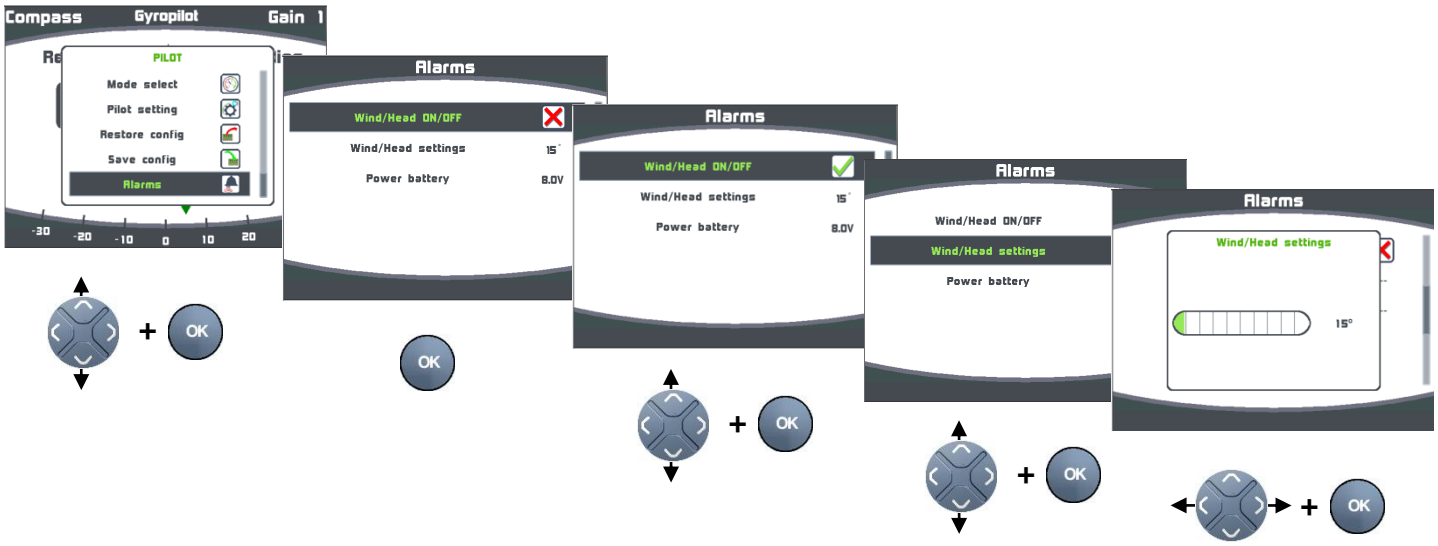
- The first alarm is called “Wind/Head’ in the system. It measures variations in wind direction when the pilot is in compass mode or heading in wind mode.

A value can be set up for the system to trigger the alarm. The default value is 15°. The alarm will sound when the wind angle variation is greater than the set value for more than 30 seconds in compass mode and when the heading variation is greater than the set value for more than 30 seconds in wind mode. The Multigraphic will display a message and sound beeps.

- The second alarm is called “Power Battery” in the system. It measures variations in the charge level of the battery powering the pilot’s drive unit. The default value is 8 V DC

The alarm is triggered when the voltage is lower than the set value. The Multigraphic will display a message and sound beeps.

Alarm setup procedure for the pilot



2.6 Operation of the *Multigraphic* as multifunction display

Multigraphic is a multifunction display from the ***TOPLINE*** range of products. It connects to the ***TOPLINE*** bus on your system and displays all data available on the bus.

The keyboard, curser pad and scroll down menus make all aspects of the system easy to use. ***Multigraphic*** facilitates control and use of your ***Topline*** system***.***

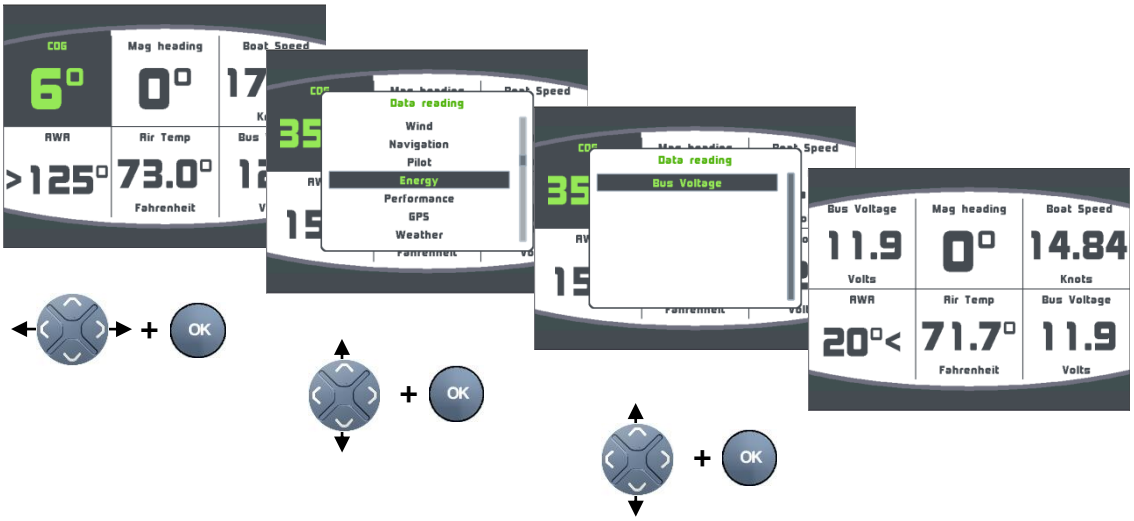
2.6.1 Edit an existing page

Once a page has been built (see paragraph 2.3), it can be edited to show temporary or permanent changes.

Temporary modification

Temporary modification of a page allows data of your choice to be displayed without saving a new layout.

Example: on the first page choose the bus Voltage instead of COG.

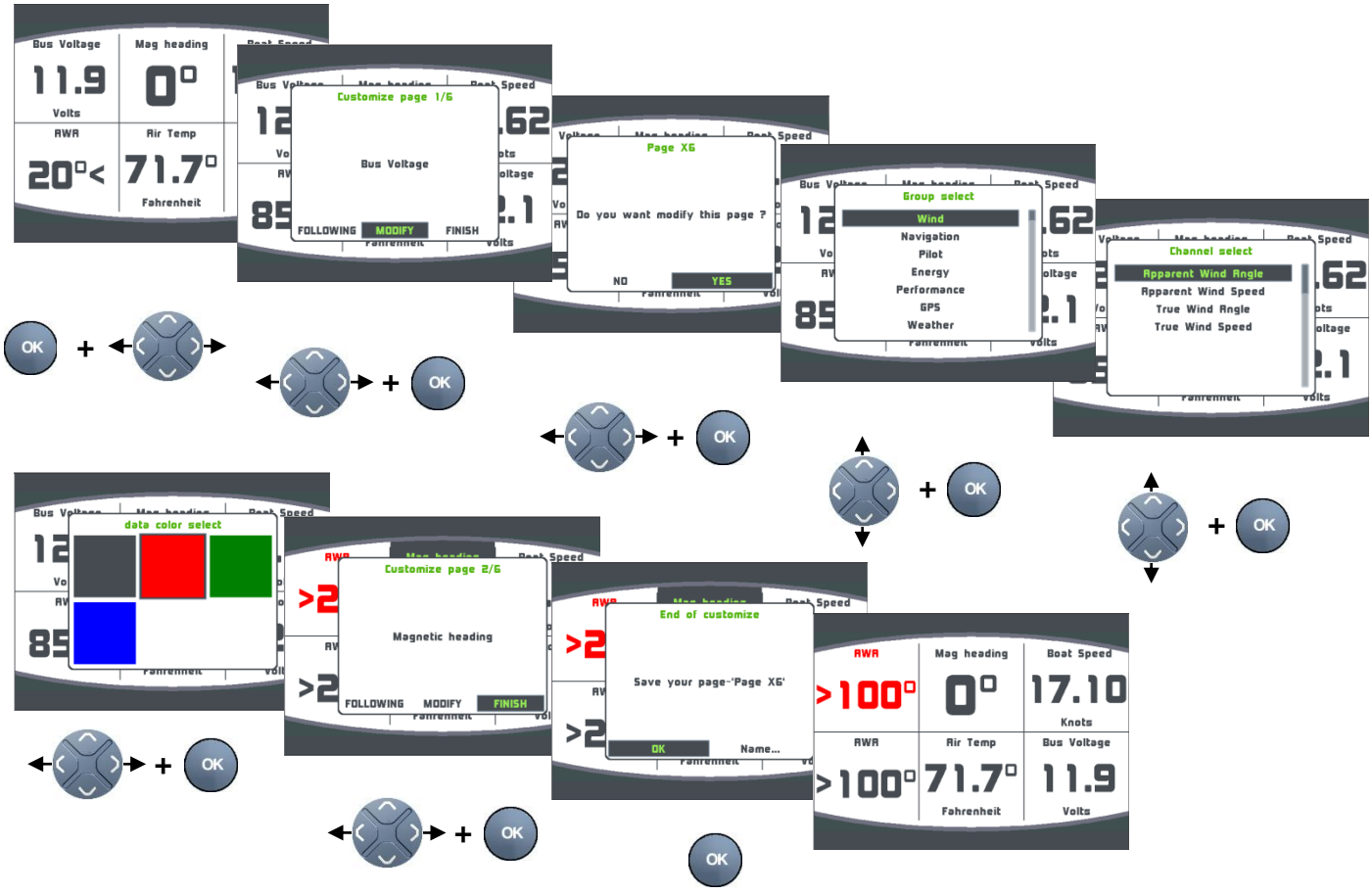


This modification has not been saved and the previous layout will return the next time the system is powered on.

Saving a modification to a page

You can edit a page and save modifications permanently.

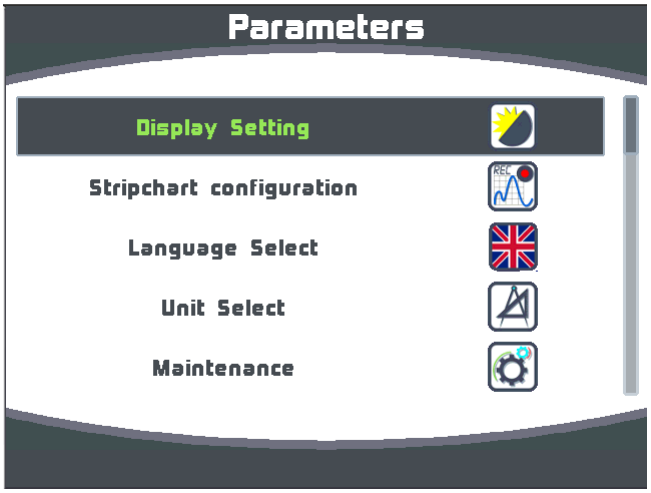
Example: on the first page now choose to display apparent wind angle instead of the bus Voltage and save this new configuration.



This page configuration can be saved or renamed and saved as a new page.

2.7 Setting parameters

Press and hold PAGE to display the main menu in which you select for the «Parameters» page.*



Use the up and down arrows of the pad to select and OK to confirm.

2.7.1 Display settings

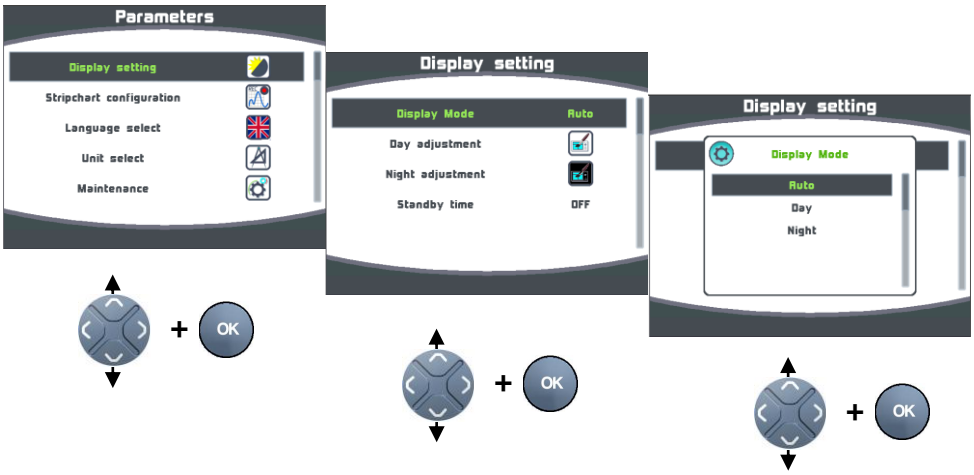
The Display Settings menu gives access to:

- The Display Mode
- The Daylight Mode settings
- The Night Mode settings
- The Stand-by timing

2.7.1.1 Backlighting

The backlightighing can toggle automatically between Night and Day settings, driven by a light sensor, or can be manually set. Backlight settings can be adjusted as required for each Multigraphic independently.

Backlight setup process:



Auto: Backlighting toggles automatically between Night and Day settings, driven by a light sensor. The Backlight intensity and the Skin are those set for each Mode.

Day: Backlighting is on with the light intensity and the Skin set for Day Mode.

Night: Backlighting is on with the light intensity and the Skin set for Night Mode.

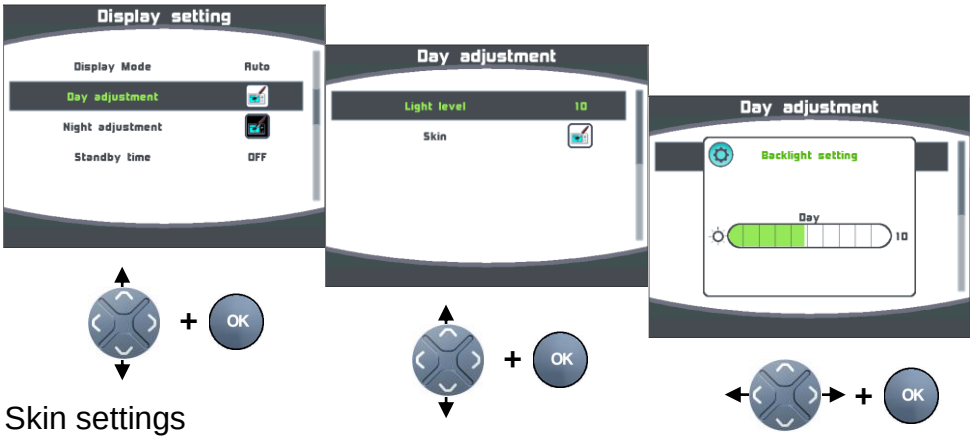
> ***Whatever page is currently displayed press and hold « OK » for 3 seconds to access directly to the backlight levels settings.***

There are 20 levels of Backlighting.

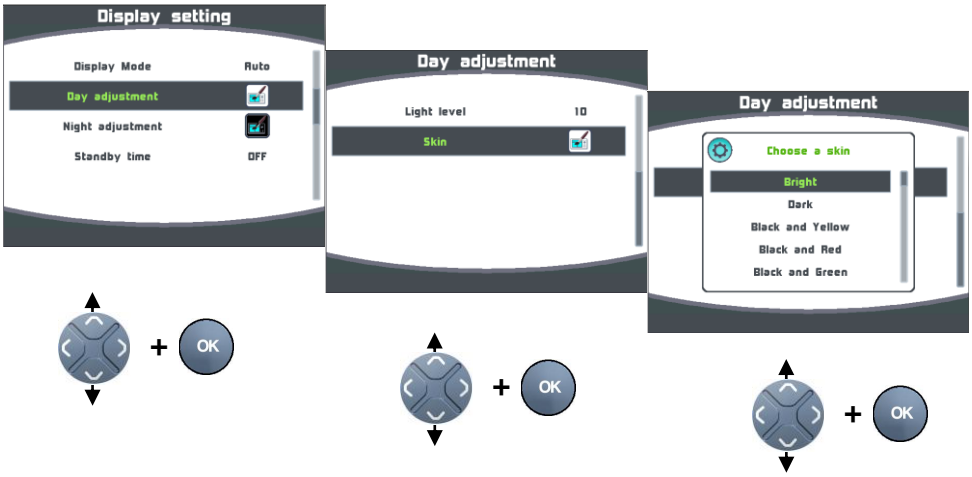
2.7.1.2 Setting Night and Day modes

Setting procedures are identical for Day mode and Night mode.

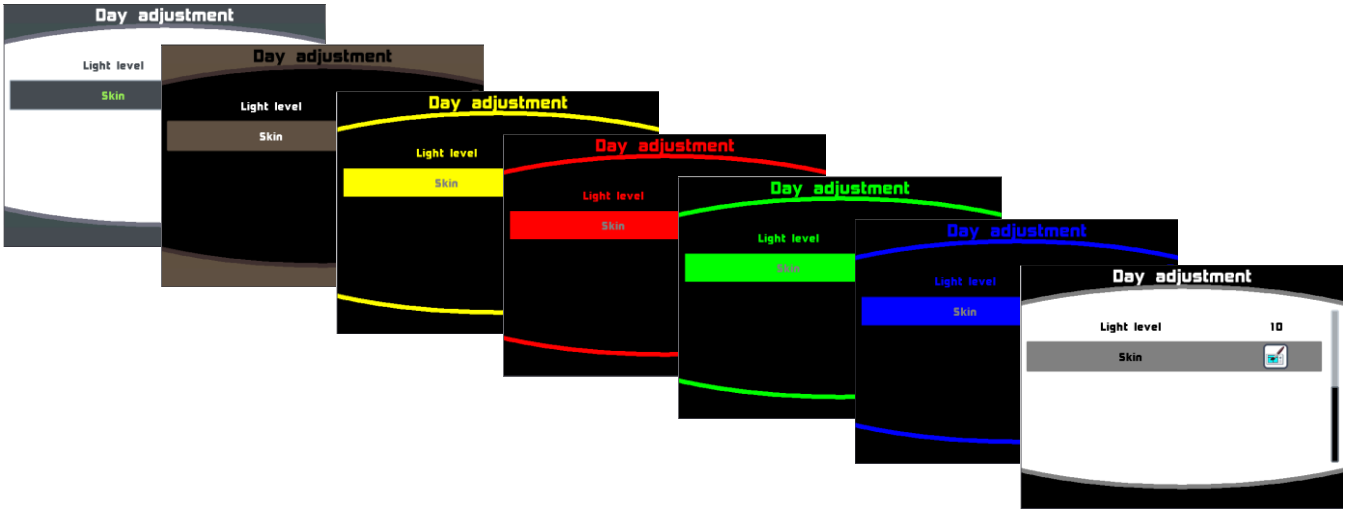
Backlight intensity setting:



Skin settings



You can choose between 7 Skins for Day and Night modes. The default Skins are white for Day and black/red for night.

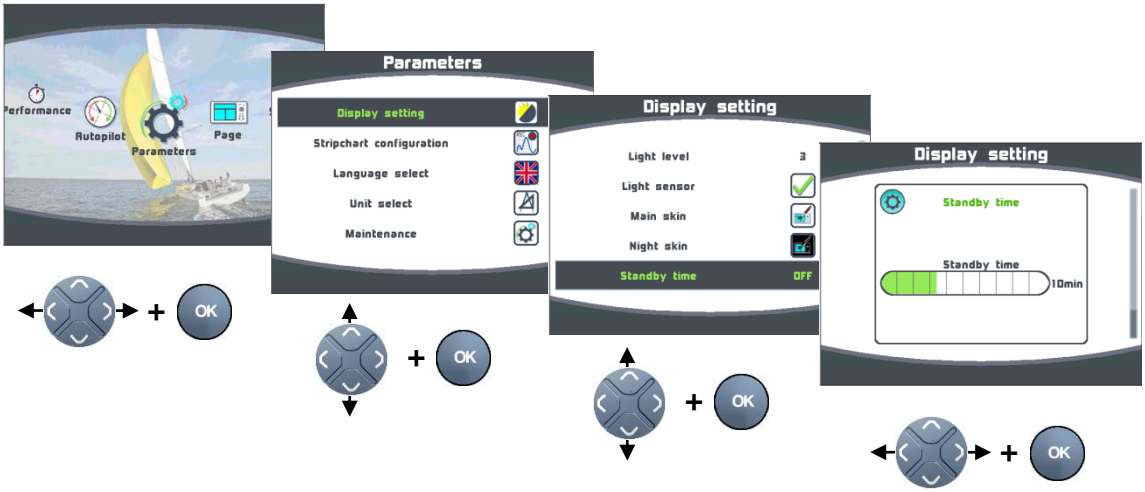


Some skins are more appropriate than others, depending of the reading angle.

2.7.1.3 Display's Standby timing

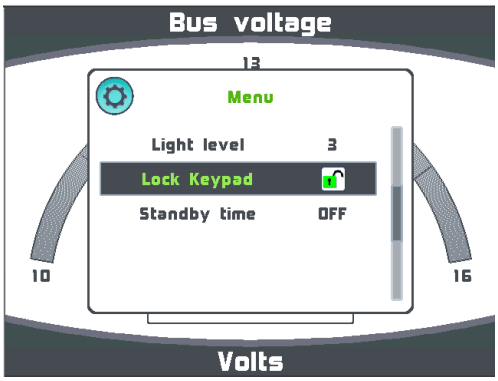
A time can be set up to 30 minutes. When the selected time is reached the display will be put in a "sleep mode" for power saving. The Multigraphic will keep working and the screen can be resumed with the simple press of any key or selecting the display on a remote control.

Setting the Display's Standby timing



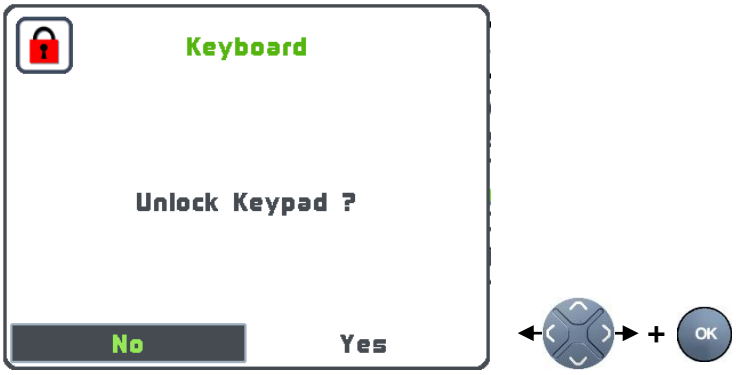
> ***Press and hold the "OK" key for 3 seconds to enter the Display Standby setting menu. This can be done from any page.***

2.7.1.4 Locking the keypad



Press and hold "OK" to enter the setting.

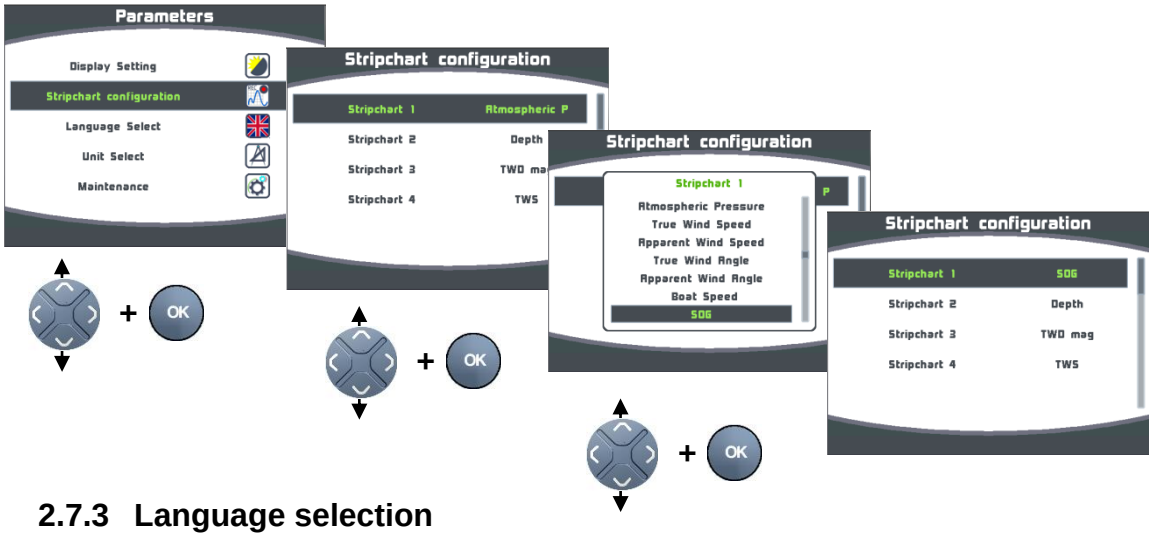
Once Lock Keypad is activated all keys are inactive and a press on a key pops up an invite to unlock the keypad.



2.7.2 Data logging: “stripcharts” settings

4 different sets of data can be logged simultaneously over a 48 hour period with a 15 seconds log rate. The logged data can be displayed on stripcharts on the « Multigraphic ».

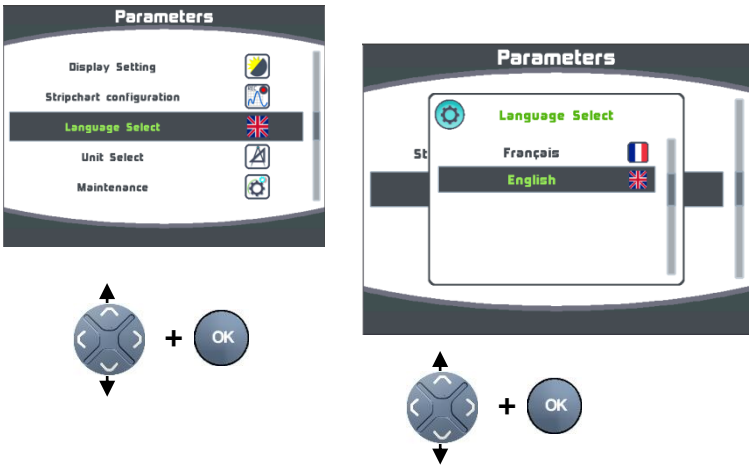
« stripcharts » settings process:



2.7.3 Language selection

Your Multigraphic can be set to display menus in various languages.

Language setting process:

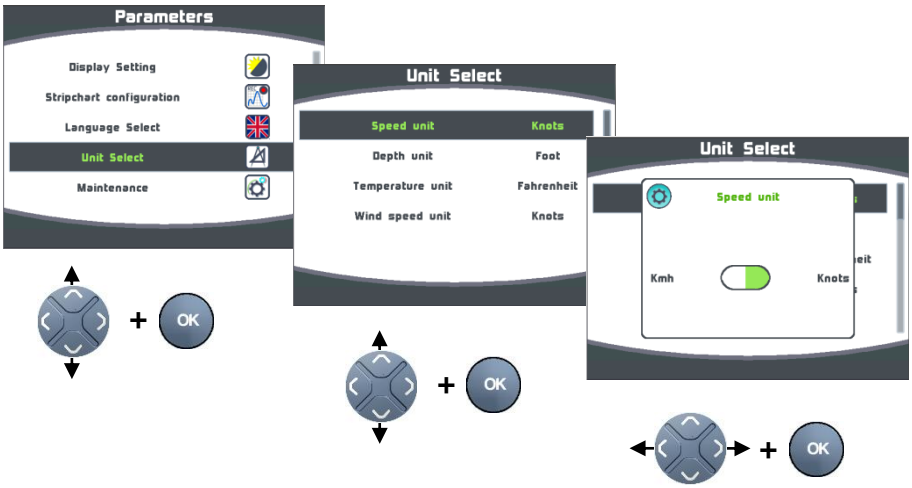


2.7.4 Unit selection

The ***Multigraphic*** can be set to use various units for boat speed, depth, air temperature, sea temperature and wind speed.

Depending on the information selectable units are « knots », « meters per second », kilometres per hour », degrees Celsius » and « degrees Fahrenheit ».

Units setting process:



2.7.5 Maintenance

2.7.5.1 Multigraphic node address in the Topline system

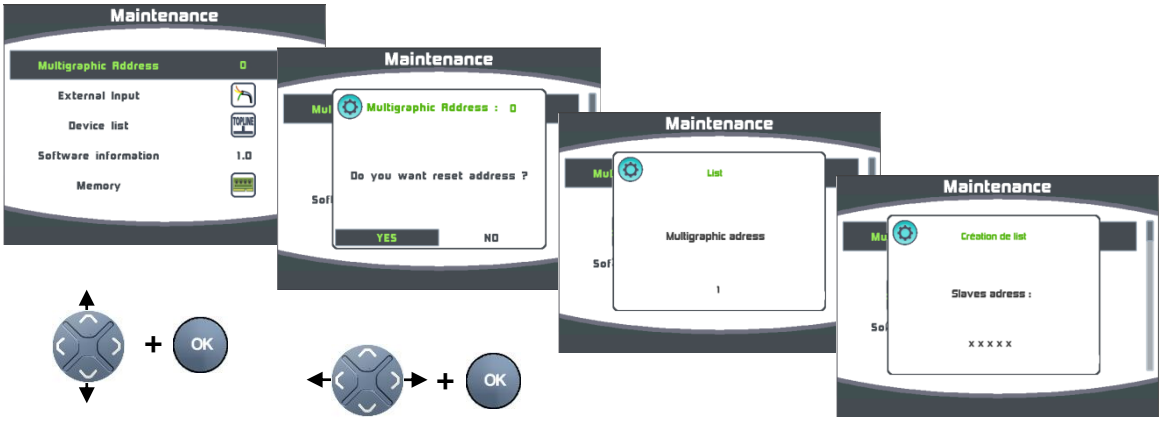
In this menu you have to give a ***Topline*** address to the ***Multigraphic***. With address n°1 it will be considered as « Master » and manages the whole system. If there is already a Master », the ***Multigraphic*** will get an address different from 1 and it will

behave as « Slave ». This process is carried out automatically: if there is no « Master » in the system, the ***Multigraphic*** will automatically be selected as « Master ». Systems with an existing « Master » will automatically deliver a « Slave » address to the ***Multigraphic***.

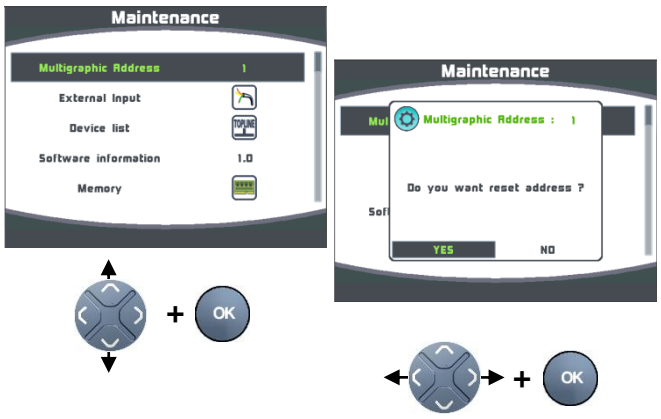
There is always the possibility to reset the address to 0 (no address).

Note: the ***Multigraphic*** comes with a factory default setting as n°0. It has no address and it cannot work with your system. Giving an address to the ***Multigraphic*** is the very first setting to do once the display is connected to the ***Topline*** bus and the installation complete.

Multigraphic address process:



Resetting the address:

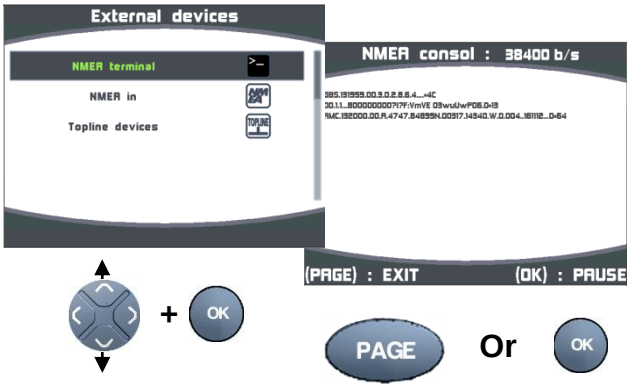


2.7.5.2 Auxiliary inputs

2.7.5.2.1 Console

The ***Multigraphic*** has a NMEA console allowing NMEA input data to be displayed.

Access to the NMEA console:

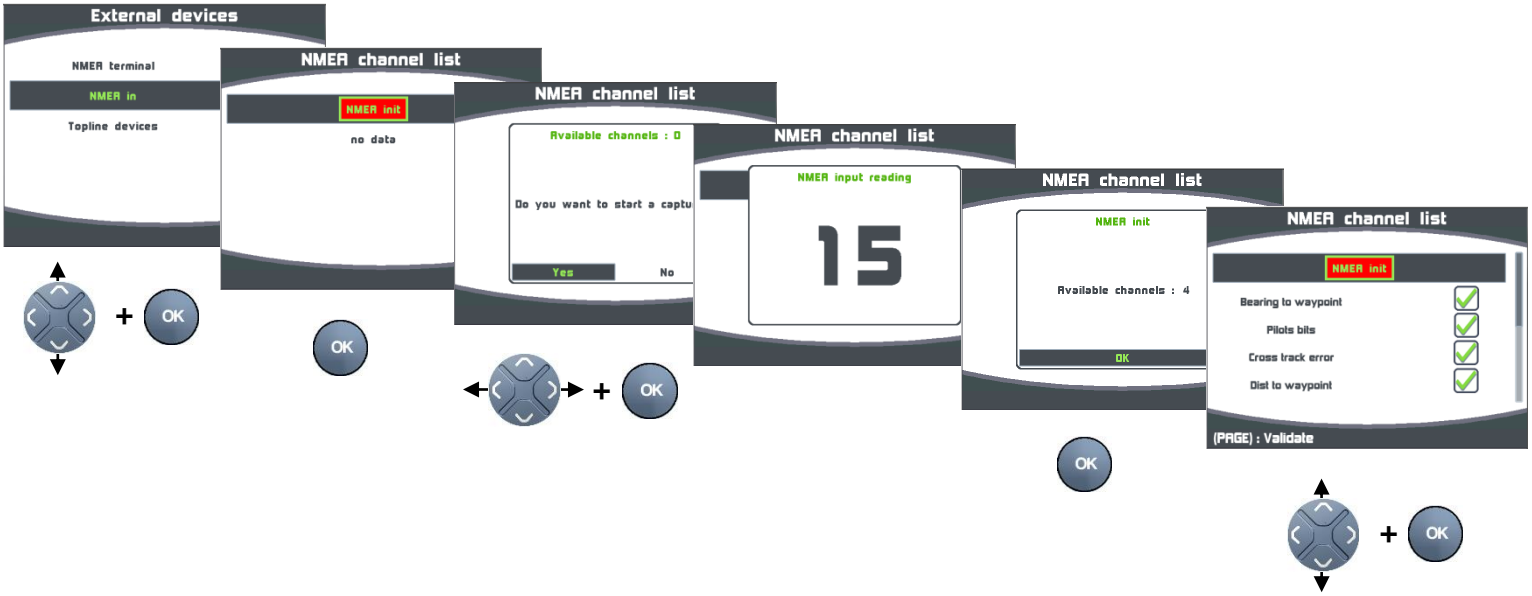


2.7.5.2.2 NMEA settings

The ***Multigraphic*** features a NMEA0183 input which allows any compatible instrument (GPC, PC…)to be connected. This port converts any NMEA incoming data to ***Topline*** channels if they do not already exist on the ***Topline*** bus. The data will be used by the ***Topline*** system. Baud rate is automatically detected between 4800 or 38400 Bauds.

Note: NMEA data coming from an A.I.S receiver connected to the ***Multigraphic*** NMEA input is directly available on the ***Multigraphic*** and does not require set up.

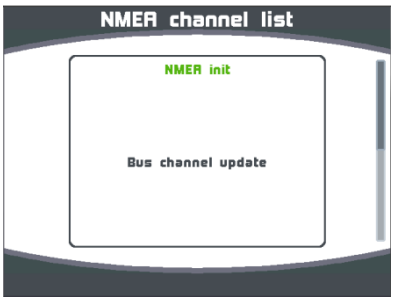
NMEA input settings:



All NMEA channels are activated by default. You can choose to inhibit some channels. This is done by selecting the chosen channel and pressing OK.

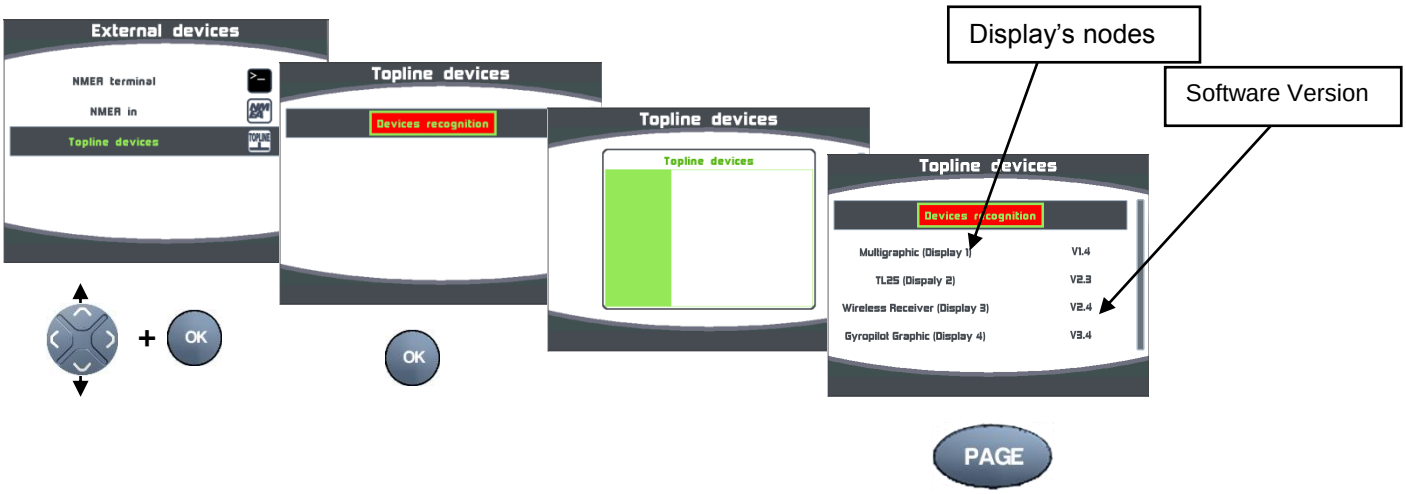
Here, Speed Over Ground is inhibited

Press PAGE to finish the NMEA settings and update the channels on the ***Topline*** bus accordingly.



2.7.5.3 Topline Instrument system

This system menu displays the properties and software versions of all the sensors and displays connected to the Topline bus.



2.7.5.3.1 Utility for the WIFI box

When the nke "WIFI box" is connected to the Topline bus, the following can be displayed:

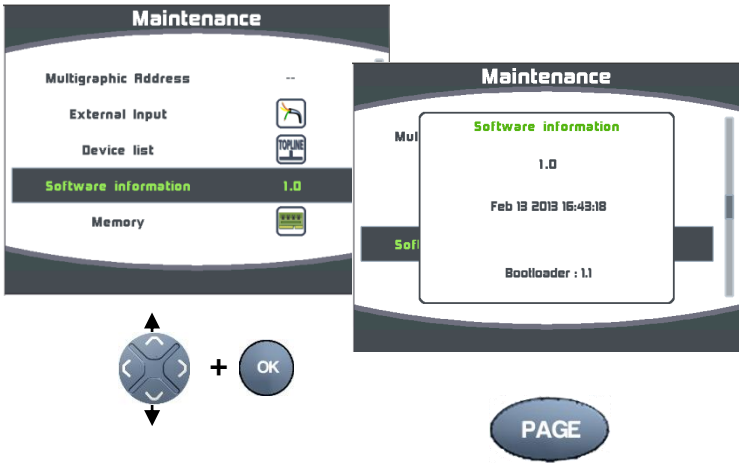
- Editable SSID
- WPA key
- editable WIFI channel
- IP for the WIFI box
- WIFI box port

Please refer to the WiFi Box manual.

2.7.5.4 Firmware

This page displays the ***Multigraphic*** software version and date of issue.

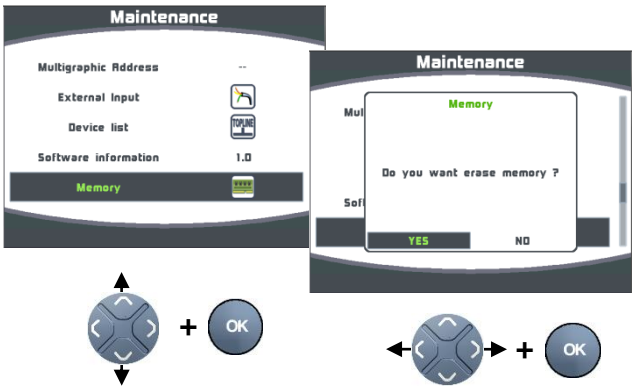
Display the firmware:



2.7.5.5 Memory

This menu allows the user to reset the ***Multigraphic*** to factory settings.

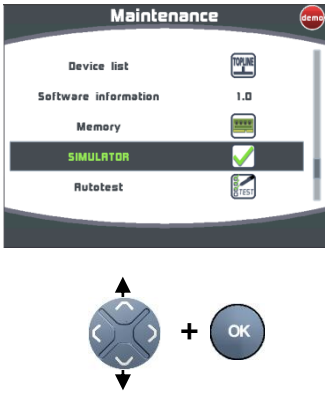
Reset the ***Multigraphic***



2.7.5.6 Simulator

There is a simulator available in the ***Multigraphic***. Once activated, it sends random data to the ***Topline*** bus and the symbol demo is shown to highlight that the system is working in simulation mode.

Simulator menu:



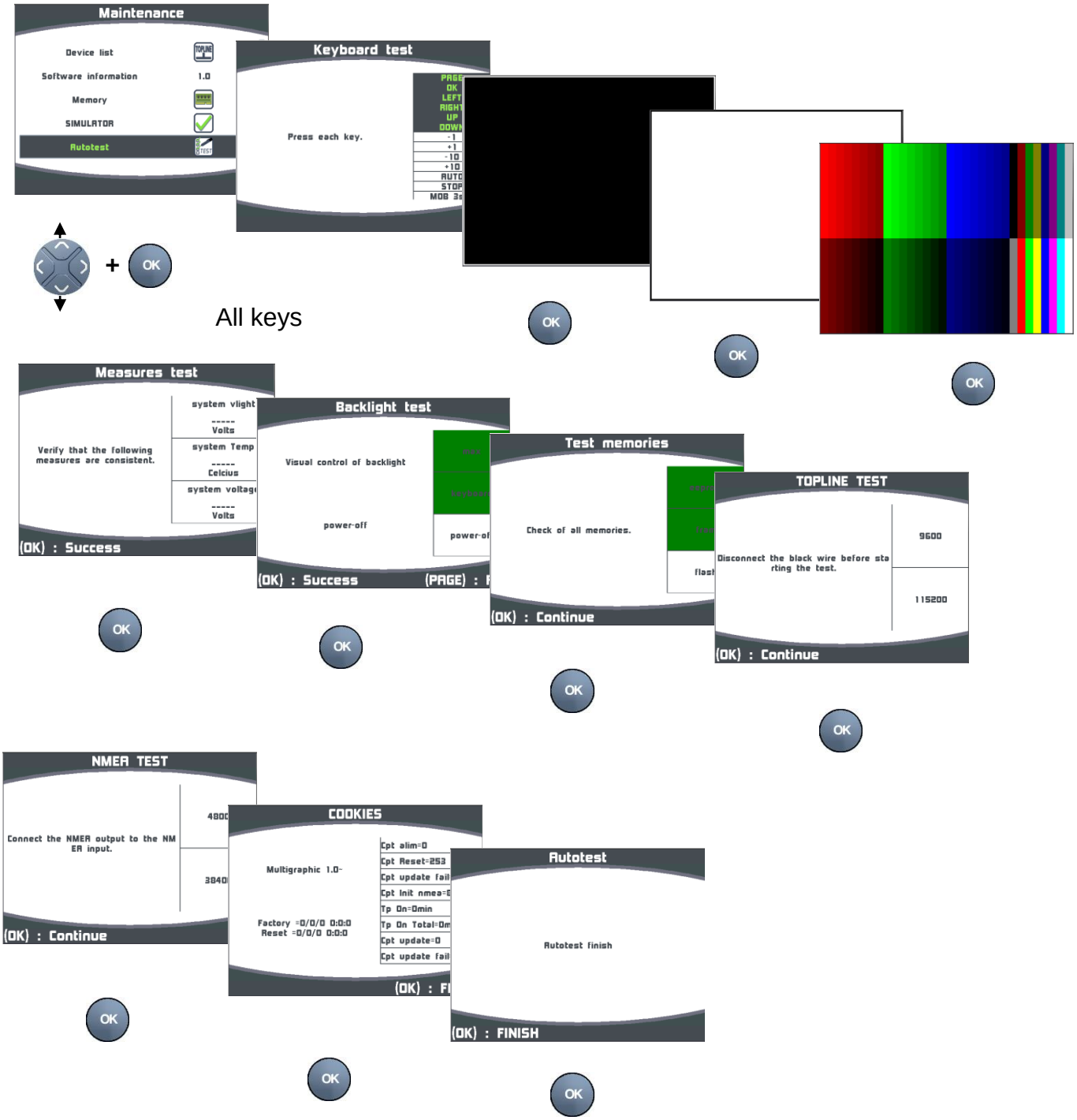
2.7.5.7 Autotest

Autotest is useful to check the ***Multigraphic.*** This procedure verifies the following functions step by step:

- keys
- colour display
- light sensor (vlight), internal temperature sensor, power supply.
- backlighting
- memory
- ***Topline*** bus
- NMEA input and output (connect the yellow and red wires together for that operation).
- Data logged in cookies

Proceed to each step by confirming with « OK ».

Once the auto-test is complete the ***Multigraphic*** restarts.


Maintenance
Device list
Software information
1.0
Memory
SIMULATOR
Autotest
Keyboard test
Press each key.
+
OK
All keys
OK
OK
OK
Measures test
Verify that the following measures are consistent.
system vlight
Volts
system Temp
Celcius
system voltage
Volts
(OK) : Success
Backlight test
Visual control of backlight
power-off
(OK) : Success
(PAGE) :
Test memories
Check of all memories.
(OK) : Continue
TOPLINE TEST
Disconnect the black wire before sta rting the test.
9600
115200
(OK) : Continue
OK
OK
OK
OK
NMEA TEST
Connect the NMEA output to the NM EA input.
4800
38400
(OK) : Continue
COOKIES
Multigraphic 1.0-
Factory =0/0/0 0:0:0
Reset =0/0/0 0:0:0
Cpt alim=0
Cpt Reset=253
Cpt update fail
Cpt init nmea=0
Tp On=0min
Tp On Total=0m
Cpt update=0
Cpt update fail
(OK) : F
Autotest
Autotest finish
(OK) : FINISH
OK
OK
OK

2.8 Sensor settings

Go to the main menu by pressing PAGE and select to display the « sensors » page.

All sensors connected to the ***Topline*** bus can be calibrated from this menu. Settings are different for each sensor. Refer to the sensor's manual for more information.

Main settings:

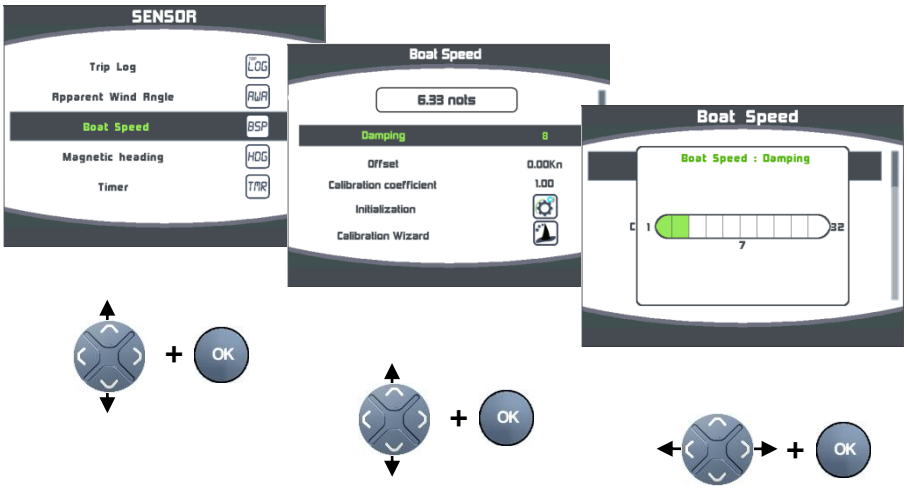
Filter: the **filter** takes the data average value to set a data refresh rate. The filter set for apparent wind speed, boat speed and heading (Regatta compass) affects the autopilot's "True Wind" mode.

Offset: applies a correction to data for some sensors.

Coefficient: applies a correction factor for calibration.

Reset: back to default settings of the selected sensor.

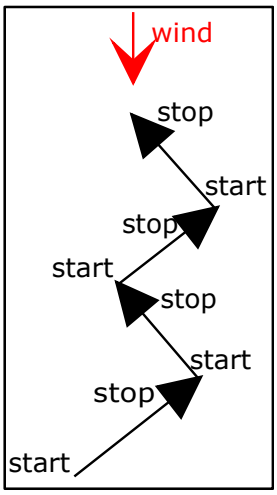
In this example we are setting the damping value for a boat speed sensor:



2.8.1 Calibration wizard

Calibration wizards are available to help you calibrate the apparent wind angle, the boat speed and a fluxgate compass (not available for the REGATTA compass).

2.8.1.1 Apparent Wind Angle calibration wizard

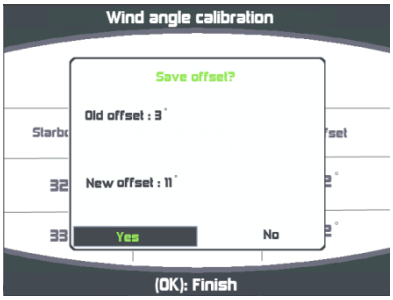


Sail 4 legs upwind to measure the average wind angle on each tack. A wind vane offset will be calculated and applied to correct the Apparent Wind Angle.

Apparent Wind Angle values must be similar from one tack to another (+-1°) when the calibration is correct. If this is not the case, the wind may have shifted, or the crew cannot sail with the same angle on each tack upwind!

Calibration of the Apparent Wind Angle

Sail once again on starboard tack and port tack to fill the table for fine calibration. Once this is done, you will be invited to save the new offset value.

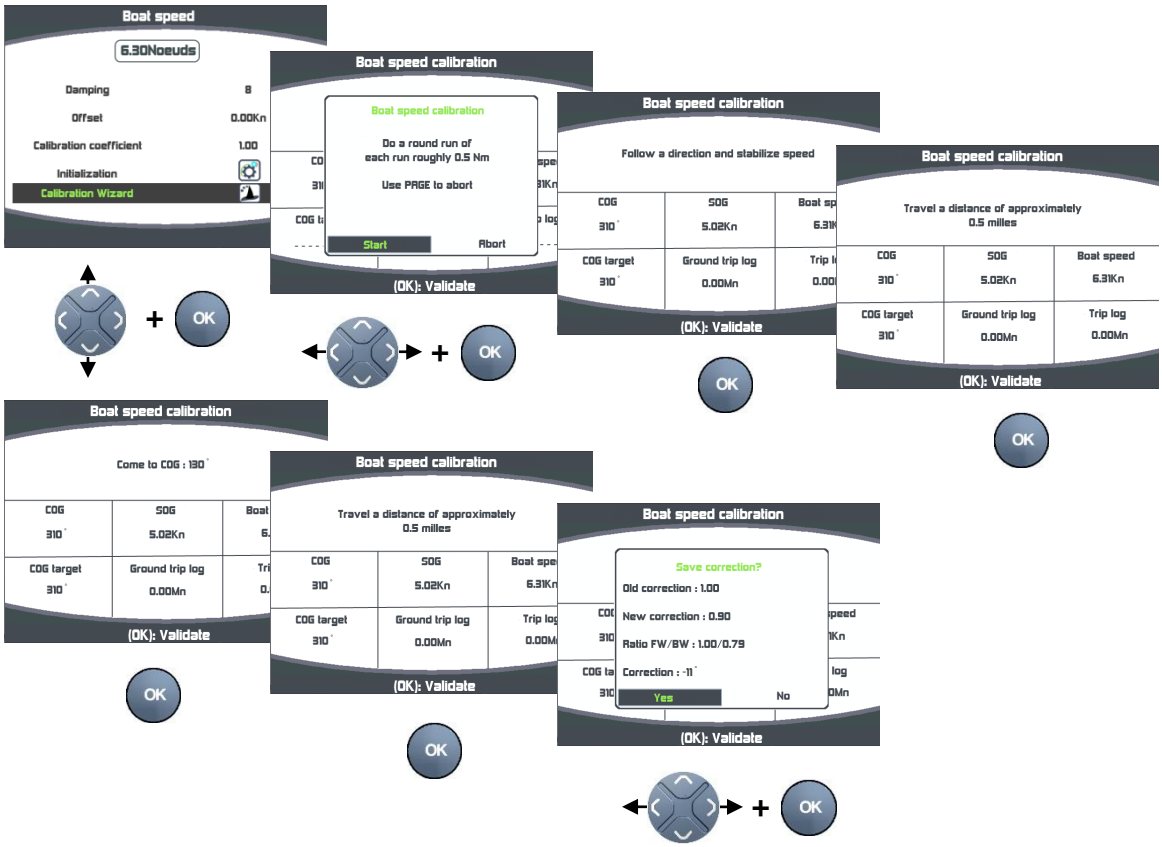


2.8.1.2 Boat speed calibration wizard

The boat speed is calibrated with the speed over ground as reference. You have to sail 0.5 nM on a constant heading and then sail back (180°) the same distance. The new calibration is processed from the current calibration value already saved (there is no need to reset the calibration value to 1).

The COG (Course Over Ground) function must be displayed on the Topline network to achieve the boat speed calibration.

Boat speed calibration



This page displays the current calibration value (old correction), the new calibration value (new correction), the factors calculated from the runs (ratio FW/BW) and the correction factor for boat speed.

2.8.2 Compass auto-adjustment

Some magnetic deviation errors are unique to each boat, due to the magnetic environment. An auto-adjustment of the compass is required to make the compass learn this environment and achieve acceptable accuracy.

2.8.2.1 Auto-adjustment principle

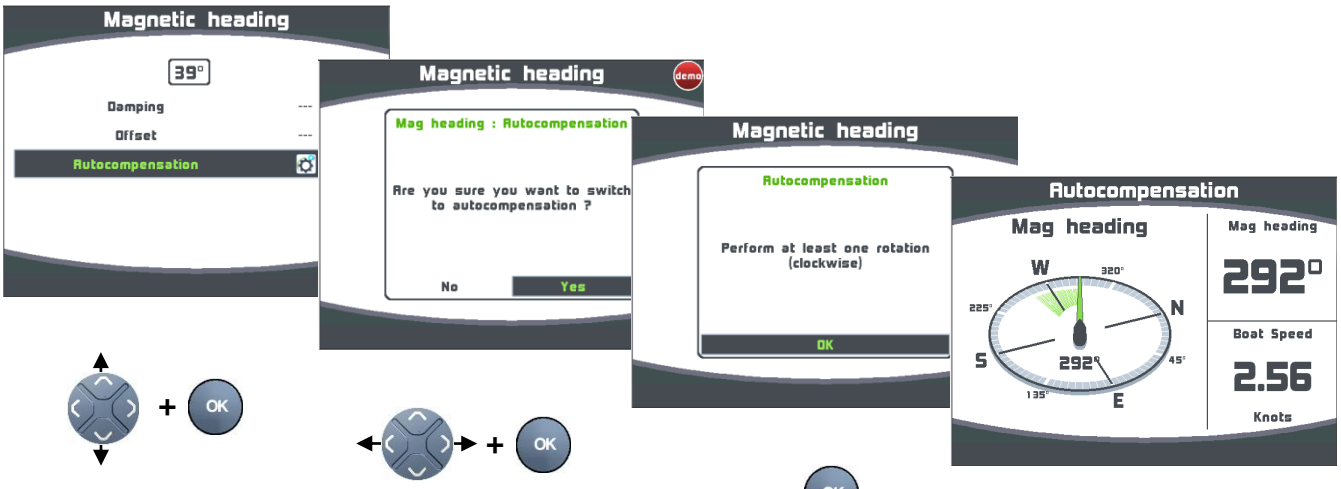
To achieve this a swing procedure is required which consists of turning the boat through a complete and perfect 360° turn clockwise at a constant rate of turn and boat speed.
During this procedure the compass builds its own deviation curve table. Corrections will be applied accurately from **0** to **359° i**n the sectors of sluggishness and unsteadiness.

2.8.2.2 Compass auto-adjustment procedure

Conditions to achieve a successful auto-adjustment manoeuvre:

- Steady waters without current.
- Safe distance from any source of magnetic field such as cargo ships.
- Safe area for free manoeuvre in a 5 boat length radius.
- Motor at constant low speed (2 or 3 knots).

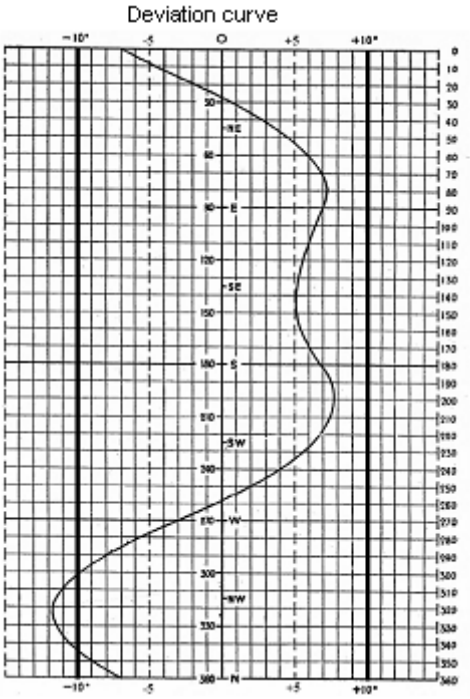
ATTENTION: the auto-adjustment operation needs to be carried with a lot of care. Motor the boat at 2 or 3 knots in a perfect circle. For the *Regatta compass,* the compass swing must be performed in less than 5 minutes. Providing you match these conditions the auto-adjustment will be successful.



While swinging the ***fluxgate***, or ***Regatta*** compass, you can display the Course Over Ground in a window to show the progress of the manoeuvre. In the case of the ***Regatta*** compass without COG data on the bus the progression will not be displayed and you will need to follow the procedure from the bowl compass at the helm.

Once the auto-adjustment has been completed a message will be displayed telling you that the operation was successful or not.

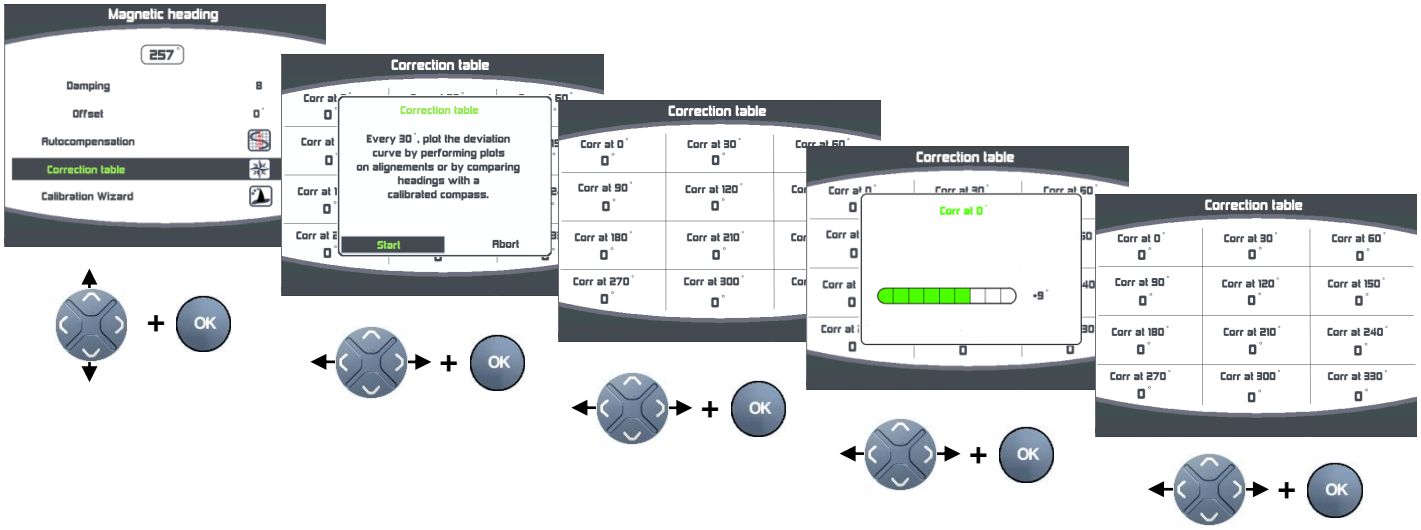
2.8.2.3 Compass deviation table



Can be used solely for the fluxgate compass

This method can be used to set up the fluxgate compass when it is not easy to complete the automatic compensation. The deviation curve needs to be set at points every 30°. Each point can be determined using leading lines, or by comparing headings against a calibrated compass with the results being used to fill the correction table with the measured values.

How to fill the correction table



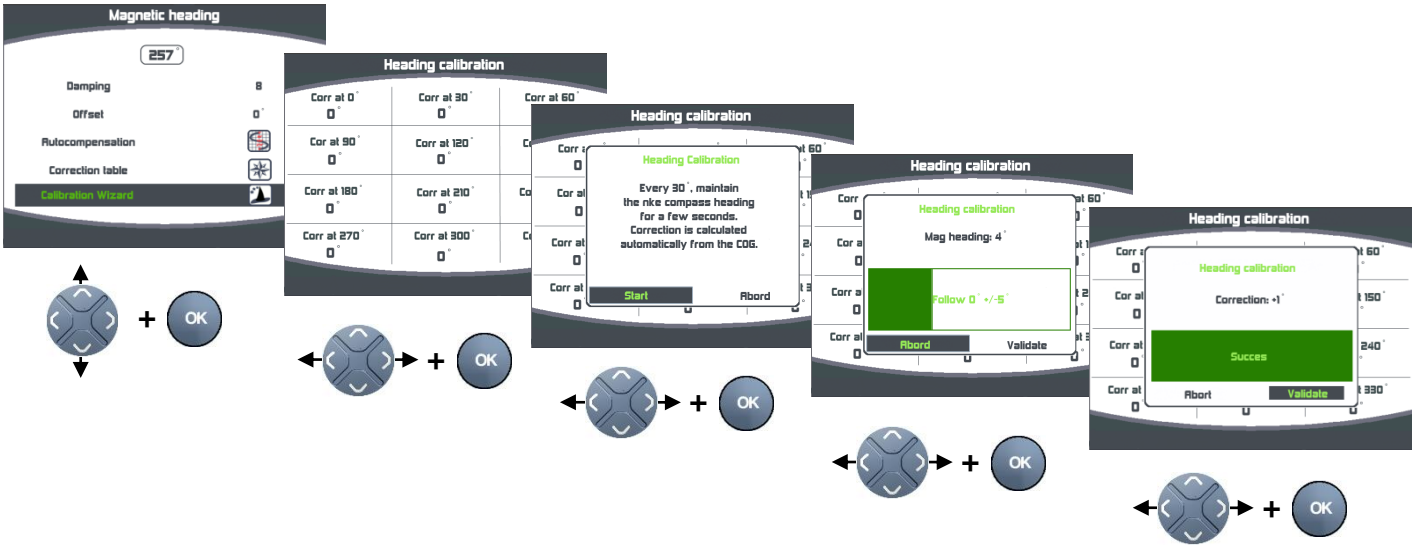
When this table is completed your compass is corrected for the deviation curve.

2.8.2.4 Compass adjustment wizard

This method can only be used with the fluxgate compass

It consists of sailing the boat on the nke compass heading (+/-5°), comparing this heading with the magnetic heading over the ground and noting the value every 30° to determine the values for the correction table.

Compass adjustment procedure

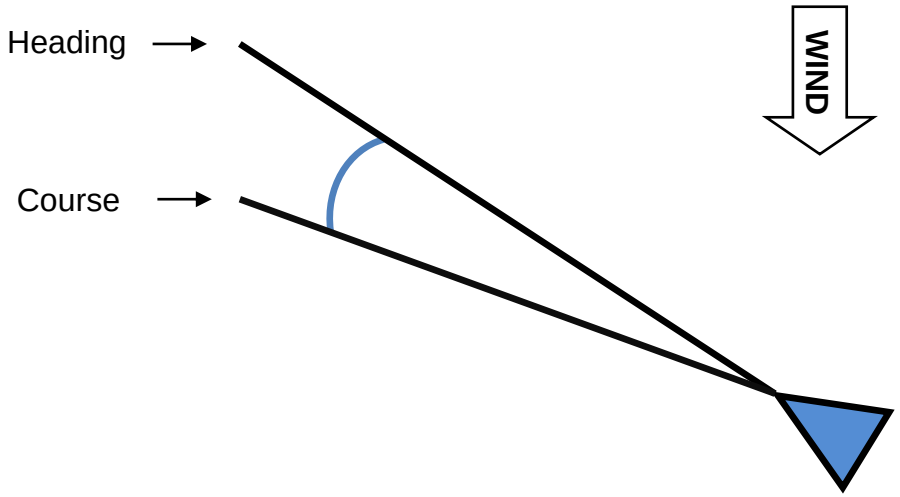


Press "***OK"*** to save the new correction. You can highlight "Abort" and press "OK" if you want to cancel a correction. Repeat this operation every 30° to fill the whole

correction table. The compass will have its deviation curve implemented once this table is completed.

2.8.3 Drift angle

Drift angle is measured between the boat's heading and its course.



This value is used for true **wind, VMG, corrected heading** and **current** calculation. Therefore it **must** be calculated optimally.

We use the following formula:

$$\mathbf{Drift} = \frac{\mathbf{Drift\ adjustment} \times \mathbf{Heel\ angle}}{\mathbf{Boat\ speed}^2}$$

The correction factor is linked to the hull shape and the boat's performance. Lower values indicate higher performance The drift value is always applied whatever the navigation conditions. Therefore, it has to be an average value, valid for all weather conditions or alternatively, you can alter that value upon the wind strength.

The drift angle for each boat speed and heel angle is shown with the polar tables supplied by your architect. Calculate the drift factors with the formula below, and determine the average value.

$$\mathbf{Drift\ adjustment} = \frac{\mathbf{Drift} \times \mathbf{Boat\ speed}^2}{\mathbf{Heel\ angle}}$$

Use a 10.0 factor if you cannot find the relevant data.

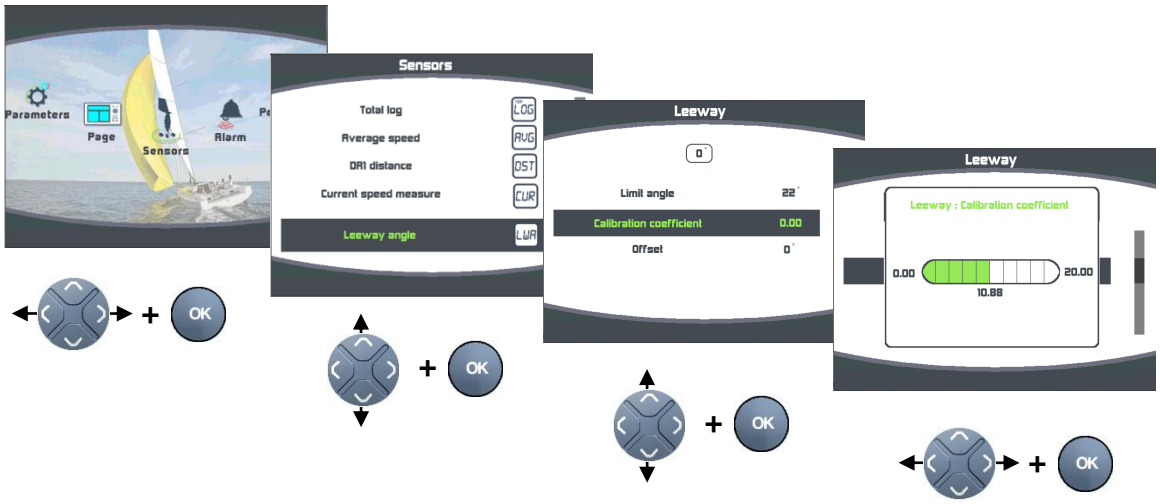
i.e. the drift with 17° heel angle and 7 knots boat speed is:

$$10 \times 17° / 7^2_{nds} + 0° = 3.46° \text{ drift angle}$$

As an alternative to this formula, an offset value can be set to force the drift angle by setting the factor to 0 and entering the desired value of the drift angle as an offset.

A maximum value can be set for the drift angle, i.e. with a 5° limit; the final result will never exceed 5° even though the data is still processed in the same way.

Drift angle data processing procedure

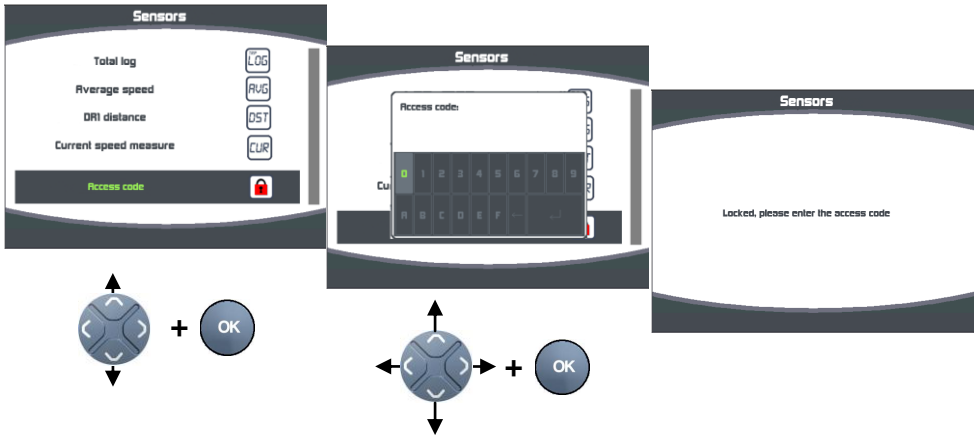


The procedure is the same for setting the maximum drift angle and the offset for drift angle.

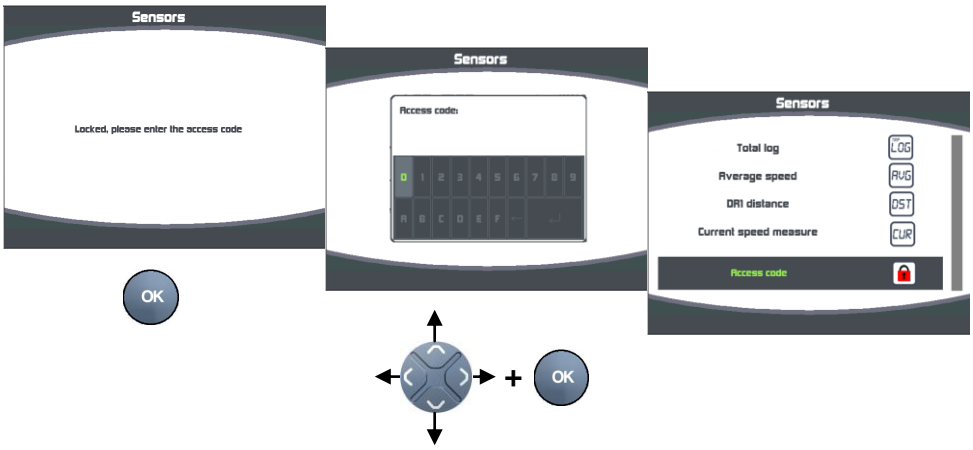
2.8.4 Sensors access code

The sensors access code is meant to protect all calibrations for the sensors connected to the Topline bus. Once activated, the access to the calibration menu is locked.

Procedure for sensor access code setting:



Procedure to unlock the sensor menu:



2.9 Alarms settings

Press and hold PAGE to display the main menu from which you select to display the « Alarm » page.

Setting alarms allow keeping watch on the value of set channels. Once the set value is reached a message is displayed and an audible signal is emitted.

For example, low and high values can be set for the ***Boat Speed*** channel.

High alarm will be activated when the data reaches the set value and above.

Low alarm will be activated when the data reaches the set value and below.

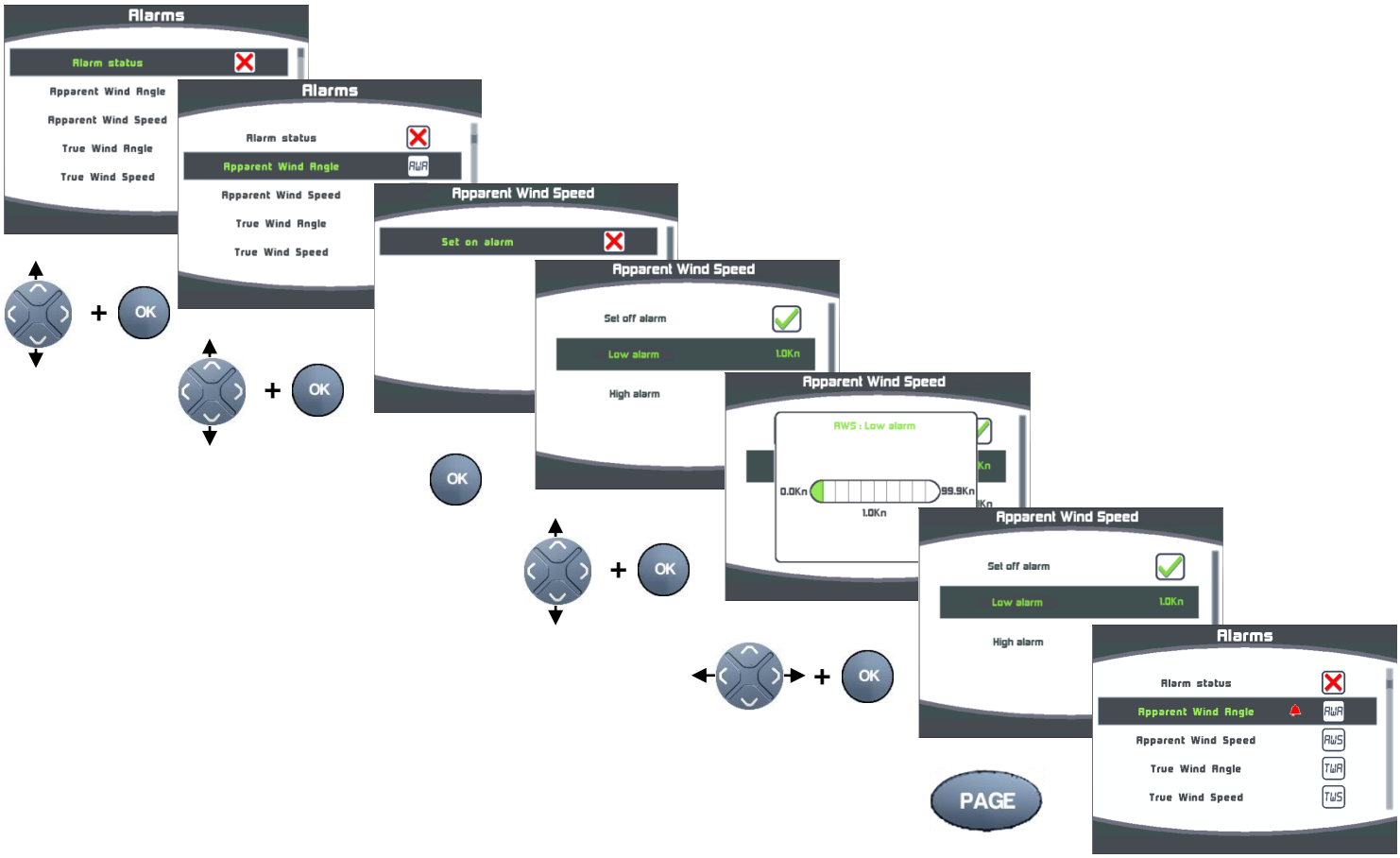
Note that for channels with angle data such as magnetic heading or wind angle the alarms sub-channels are based on a value +/- x from a reference angle called "***base alarm"***.

Setting alarms is an efficient way to monitor the ***TOPLINE*** system and the way your boat is sailing.

2.9.1 Alarm setting procedure

In order to use alarms you must first select the data you want to monitor and then determine the low and high values or the base and ranges for angles. Once set up, the icon indicates the validation of the relevant channel.

Here is an example of alarm setting for low value of the apparent wind speed:

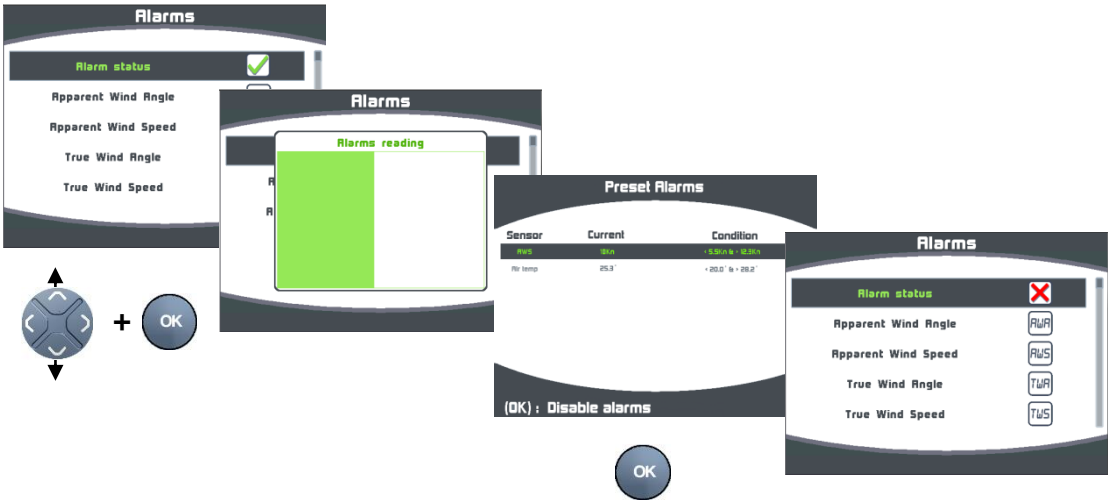


2.9.2 Procedure for Alarm setting

Once you have selected the data to watch the alarm system must be activated on the ***Topline*** bus. A status window will show before activation.

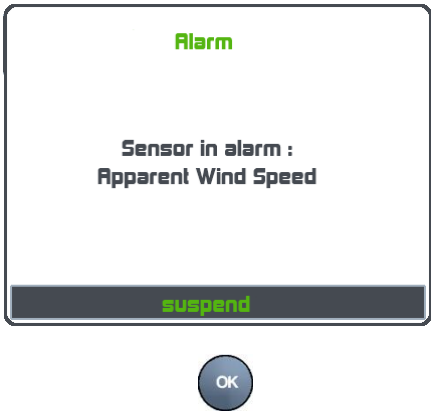
2.9.3 Procedure for deactivation of Alarms

Once alarms are deactivated no data will be monitored by the system.



2.9.4 Activation of an alarm

When an alarm is activated a window will appear showing which data is activating the alarm and an audible signal is emitted. The data for this channel is displayed in red on the relevant page of the Multigraphic. Press OK to pause for 10 minutes. If after 10 minutes the conditions are still met for the alarm to activate, the window will resume.



2.10 A.I.S. page

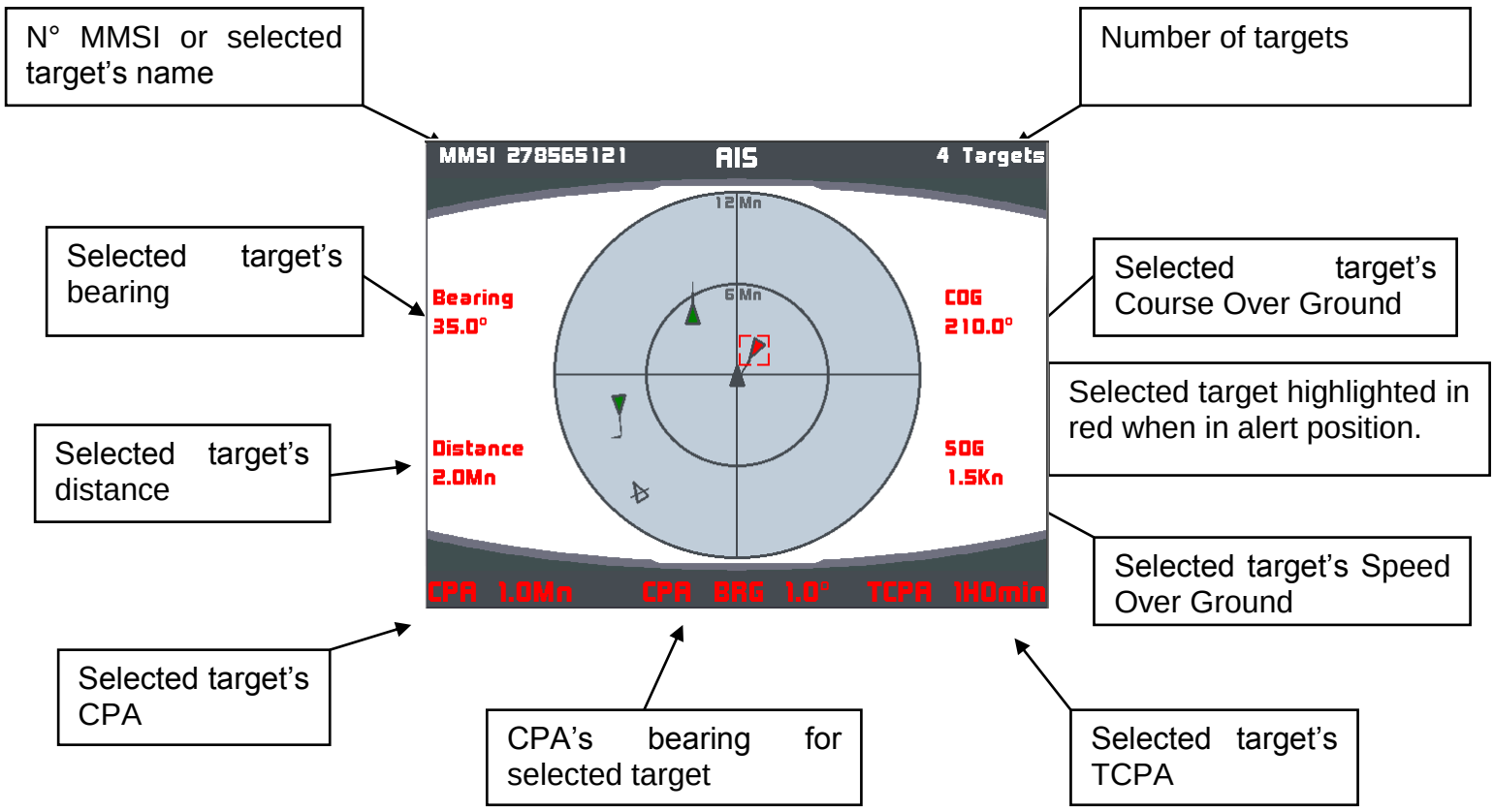
A.I.S. (**A**utomatic **I**dentification **S**ystem) is a worldwide system for exchanging information between ships and stations ashore. A.I.S uses dedicated VHF frequencies to automatically broadcast information such as ship's identification, status, position and route. This information is available to any ship or traffic control station within the signal reception area.

The NMEA input of the ***Multigraphic*** can be connected to an A.I.S. receiver to display A.I.S. targets and to calculate collision risks.

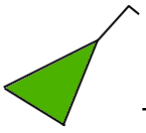
Glossary:

CPA (Closest Point of Approach) is the shortest distance to the meeting point of two vessels in approach. This is used to measure the collision risk.

TCPA (Time Closest Point of Approach) is the time remaining until CPA (hours, minutes and seconds)



2.10.1 A.IS. targets symbol

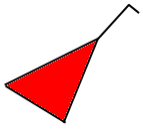


The green targets are non-hazardous vessels and they are not inside the alert limits you have defined. The front arrow represents the vessels movement.

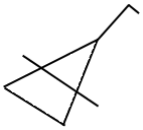
Warning:

If you have not set any alert limits, all the targets will appear with a green symbol, even those on a collision course.

Non moving target



The red targets are hazardous vessels that are inside the CPA and TCPA limits you have set. The front arrow represents the vessels movement.



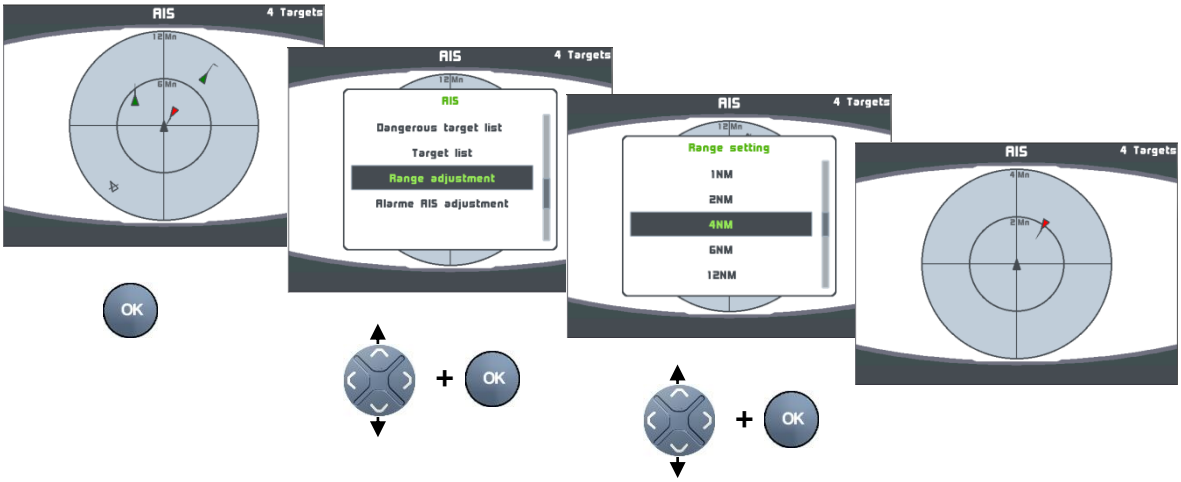
The white and striped targets are vessels from which no AIS message has been received for the last 90 seconds. These will no longer been displayed after 10 minutes.

Selected target is highlighted by a frame.

AIS Man Overboard

2.10.2 Setting the radar-like scale

A display scale can be set-up for targets in accordance to navigation zones. 5 scales are available: 1M, 2M, 4M, 6M and 12M. The default setting of the ***Multigraphic*** is 12M.



2.10.3 Setting A.I.S. alarms

The ***Multigraphic*** features an alarm processor which, once connected to an A.I.S. receiver or transponder, calculates bearing and distance of a target vessel, the ***CPA*** (Closest Point of Approach), the ***CPA*** bearing and the ***TCPA*** (Time to Closest Point of Approach).

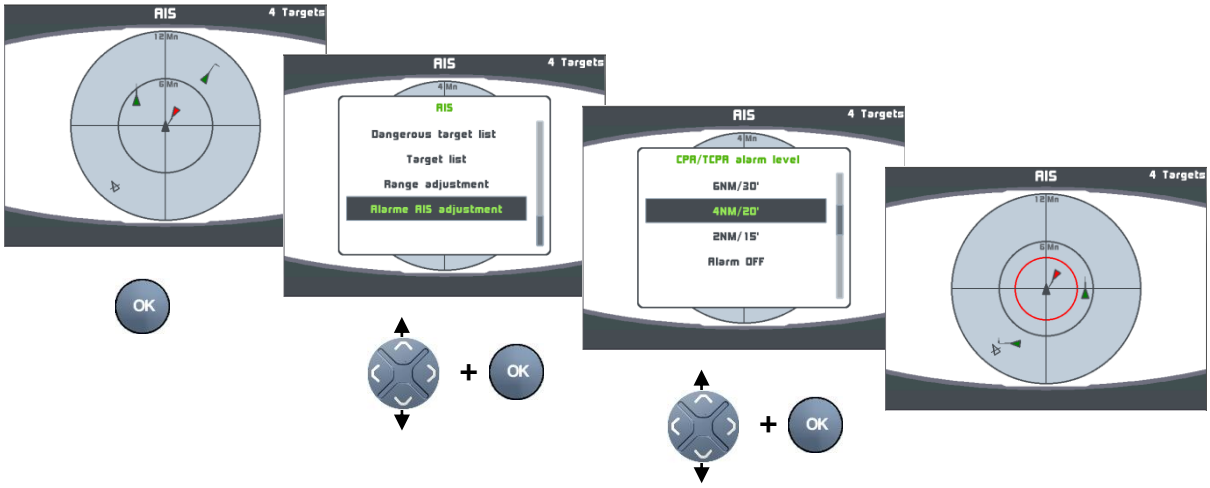
It generates alarms according to the level activated:

Alarm if ***CPA*** < 6 nautical miles and ***TCPA*** < 30 minutes

Alarm if ***CPA*** < 4 nautical miles and ***TCPA*** < 20 minutes

Alarm if ***CPA*** < 2 nautical miles and ***TCPA*** < 15 minutes

Alarm off



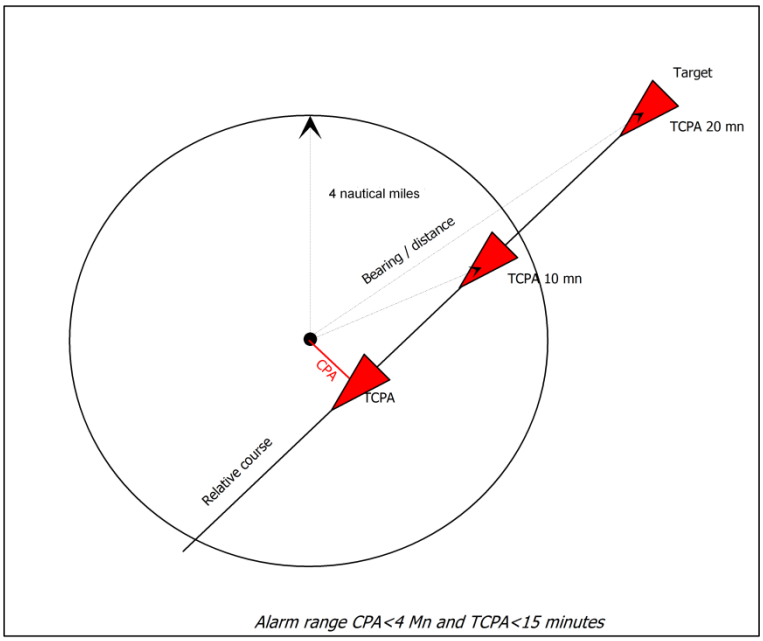
The red circle represents the alarm zone.

2.10.4 Collision avoidance calculation

The ***Multigraphic*** constantly scans messages received via the A.I.S. receiver/transponder. The unit will generate an alarm if a target is detected and its ***CPA*** and ***TCPA*** are both below the level defined. The relevant target will appear red.

.

Alarm principle

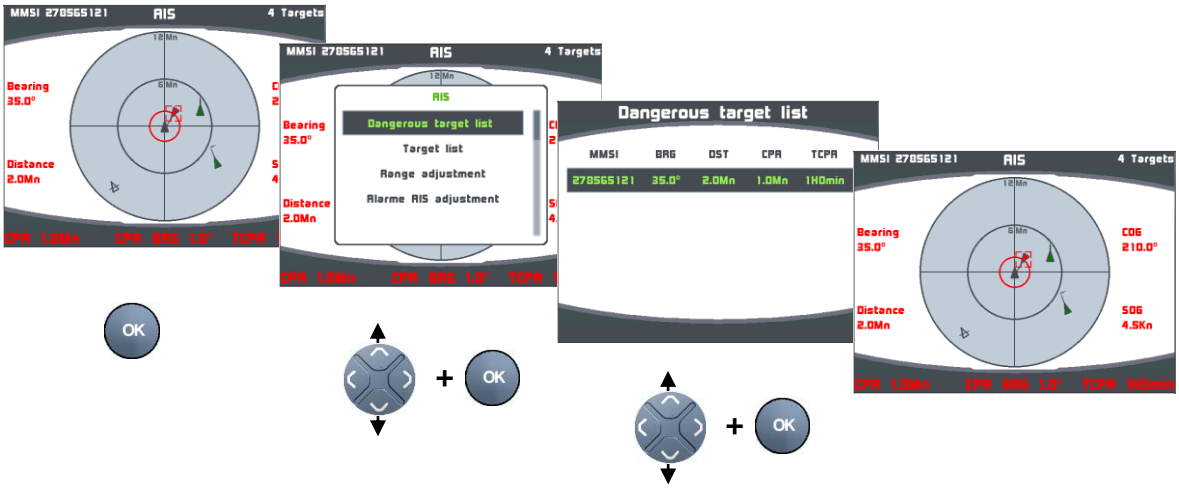


Alarm range CPA<4 Mn and TCPA<15 minutes

The alarm has been set for « **CPA < 4 Mn and TCPA < 20 minutes** ». As a result, ***CPA*** being below 4 miles **and** the ***TCPA*** calculated value being below 20 minutes, the *Multigraphic* triggers an alert.

2.10.5 Dangerous targets list

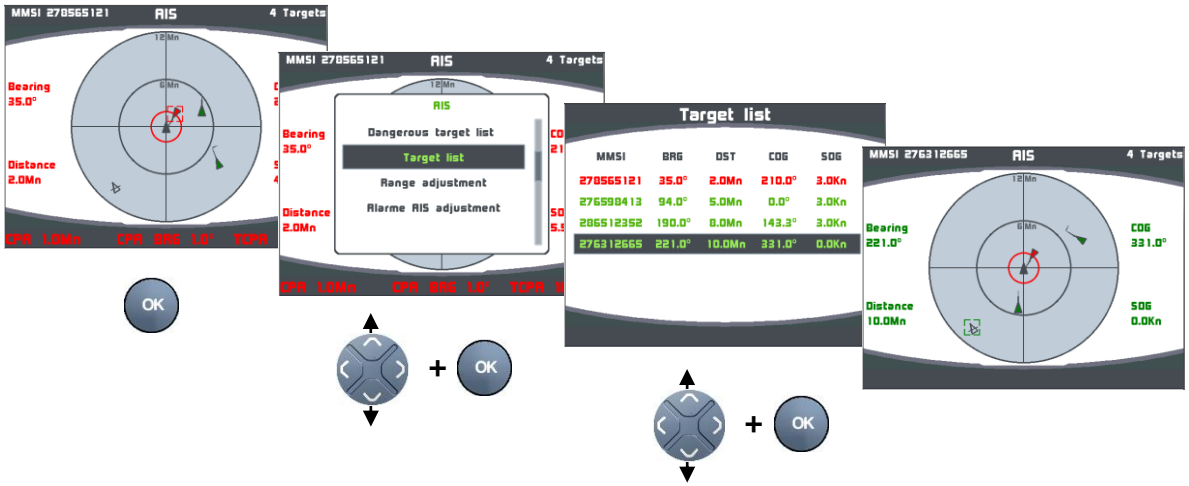
The list of targets representing a threat shows all targets that are in the alarm zone. They are sorted by threat level. For each of them the MMSI number, the bearing, the distance, the CPA and the TCPA are displayed.



Any target can be selected from the targets list and pressing OK displays it on the A.I.S. page.

2.10.6 Monitoring the fleet

A fleet list shows all A.I.S. targets sorted by distance from the closest. The targets that represent a threat are displayed in red.



Any target can be selected from this targets list and pressing OK displays it on the A.I.S. page.

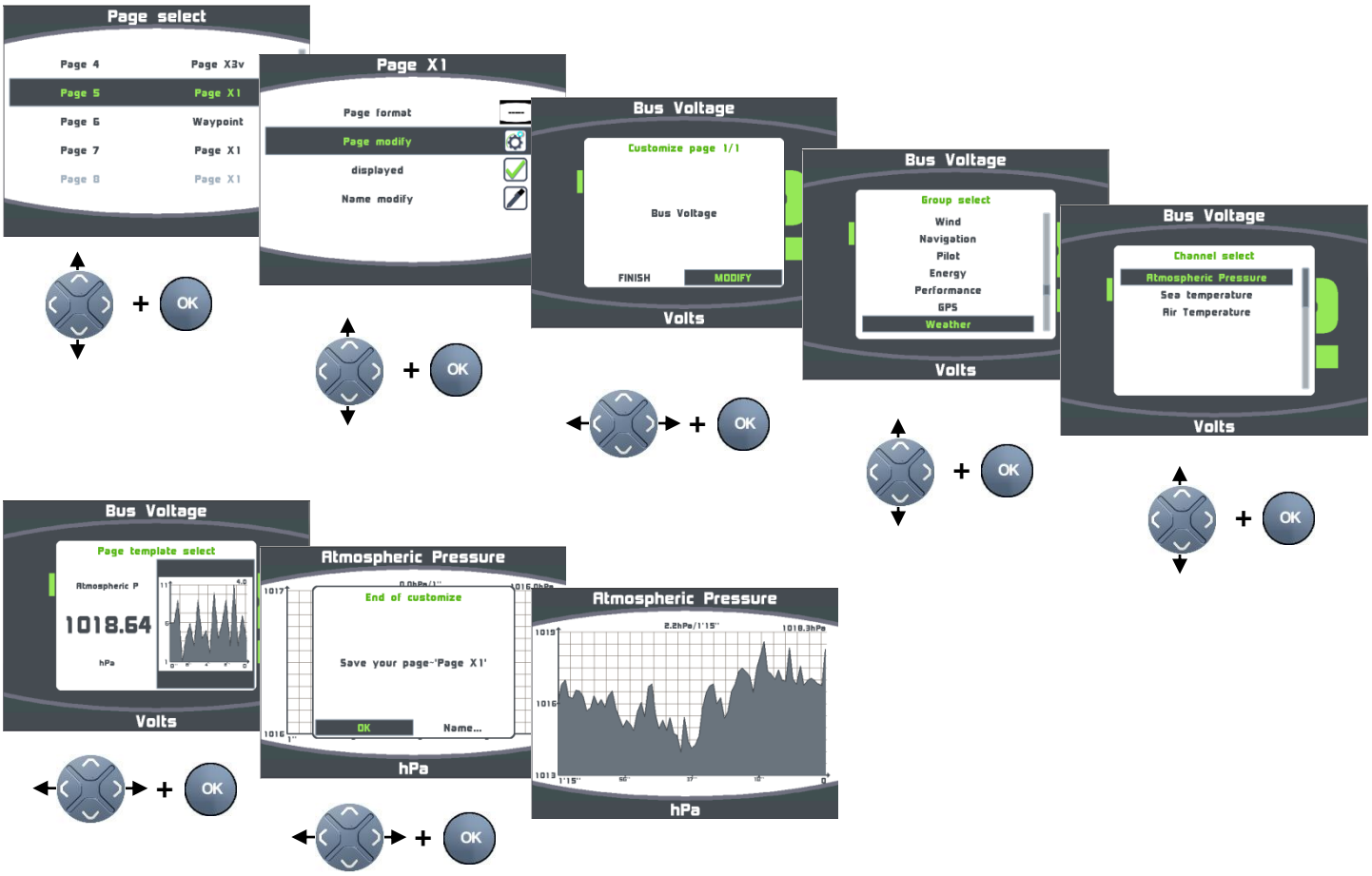
2.11 Graphs display

Some data coming from the ***Topline*** sensors can be displayed as a graph.

All data stored in the log can be displayed as a graph with a zoom function ranging from 5 minutes to 48 hours depending on the time they have been logged.

Data which is not stored in the log can be displayed on a 5 minutes scale.

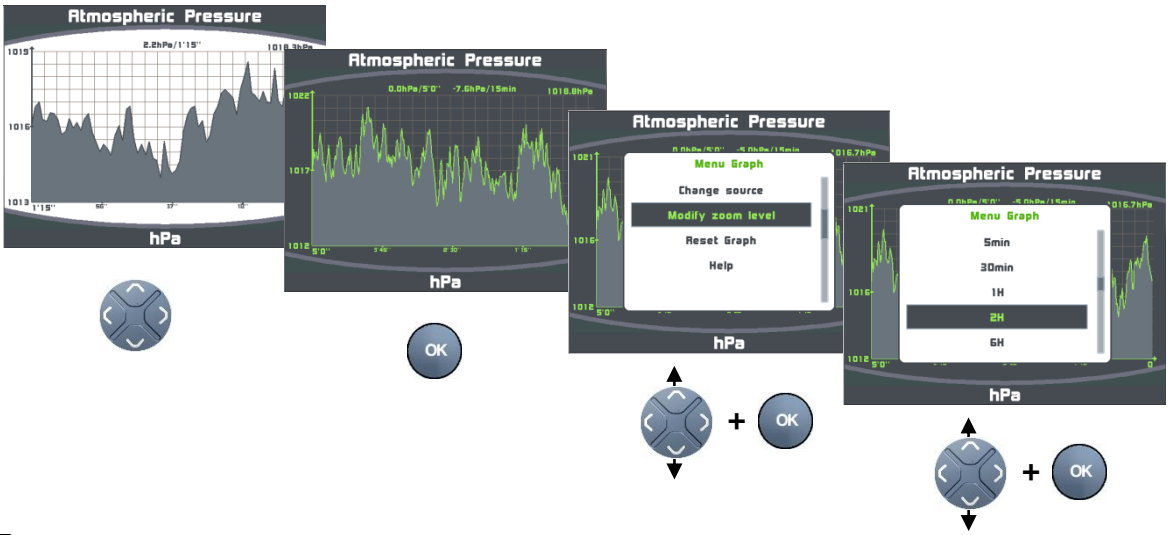
When you build or edit a page a graph widget is shown for the data which can be displayed as a graph.



2.11.1 Change the graph scale

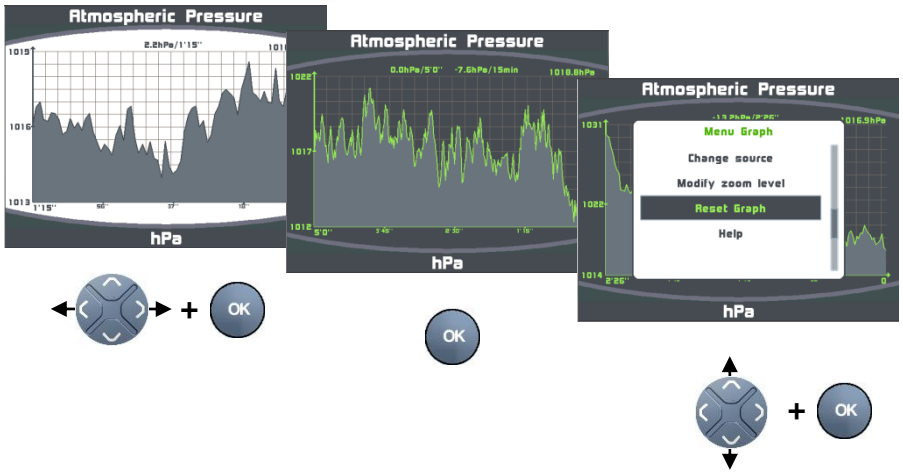
8 scale levels are available for data which is stored in the log: 5 minutes, 20 minutes, 1 hour, 2 hours, 6 hours, 12 hours, 24 hours and 48 hours.

Procedure to change the graphs scale:



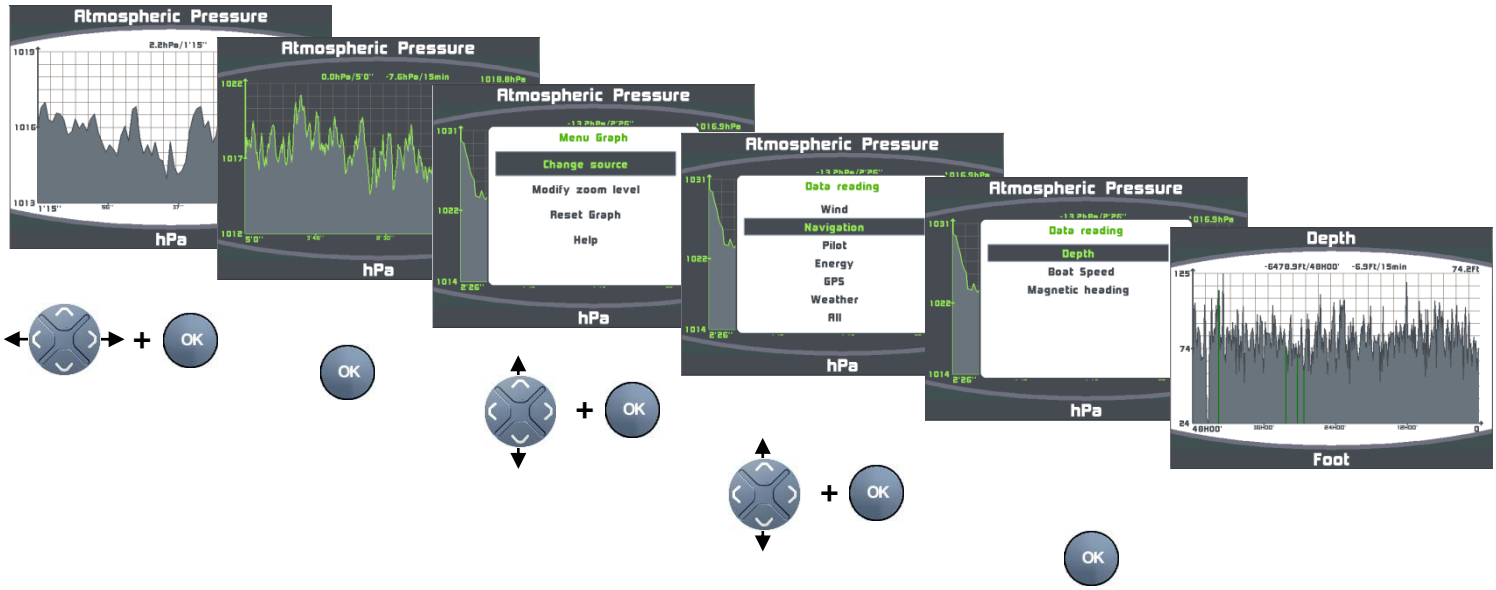
2.11.2 Resetting the graph

Resetting the graph erases the data in the log.



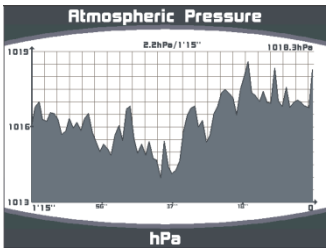
Displaying other data

From a graph page it is possible to display other data. This does not affect the page construction. It is a temporary display which will not be saved.



2.11.3 Navigating in the graph

Use the left and right arrows to display specific sections of the graph through logged data once you have set the graph's scale (§ 2.11.1).



Green marks show no data in log (ie the unit was powered off).

Red marks show that the Topline bus was not in working order.

2.12 Race timer

The race timer works as a countdown before the start of a race. Two different race procedures can be set up as ***« T1 »*** and ***« T2 »***. The default settings are 8 minutes for ***« T1 »*** and 4 minutes for ***« T2 »***. At the end of the countdown, a short audible signal is emitted at the 5 last seconds signal and the start time triggers a long audible signal. These audible signals are repeated by every display.

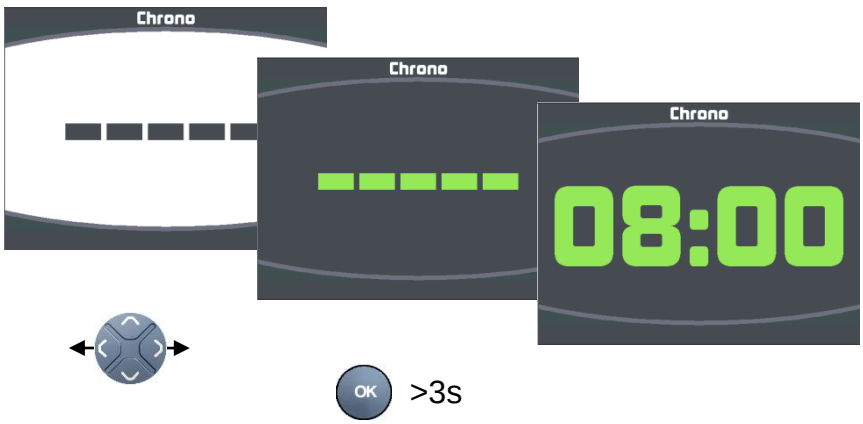
Once the countdown reaches « 0 », the timer starts for the race time in hours and minutes.

The timer data is available on the ***Topline*** for any display to repeat it.

2.12.1 Using the race timer

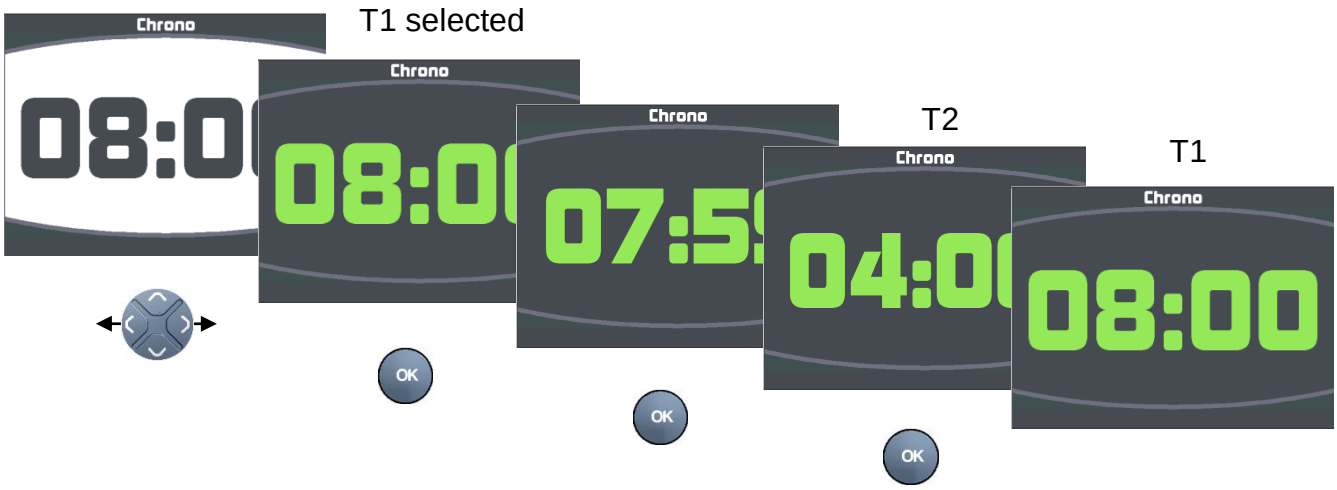
- Setting the race timer

Before starting the timer, it must be prepared by displaying ***« T1 »*** on the channel.



- Starting the timer

To start the timer, the Timer must have been selected. When ***« T1 »*** counts down, a short press on ***« OK »*** toggles to ***« T2 »***. At any time, a long press (>3s) on ***« OK »*** toggles back to « ***T1 »***.

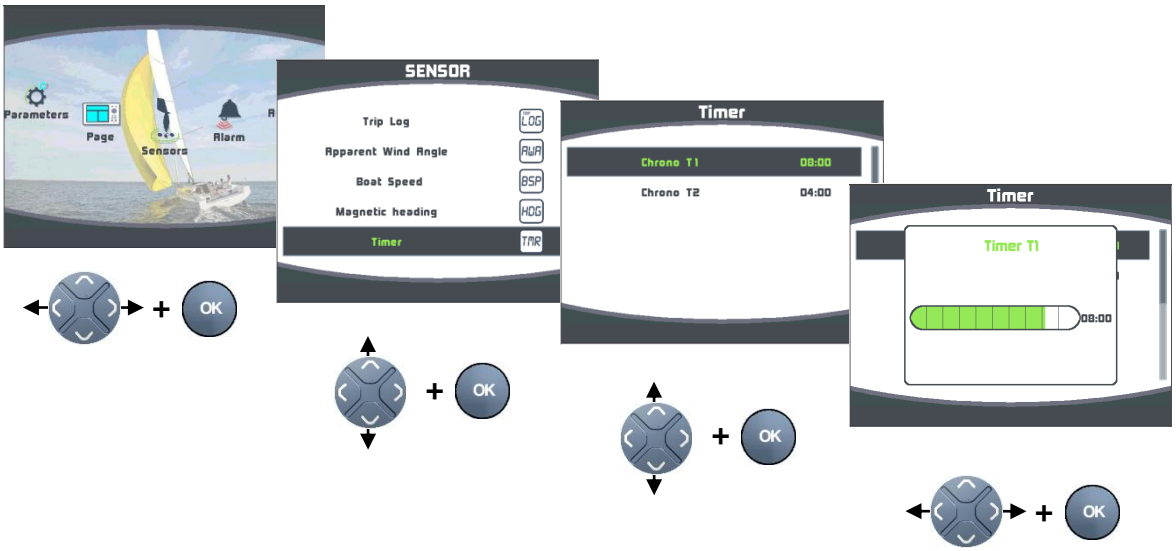


- Starting the race timer

The **timer data must be selected** before starting the race timer. During the “T1” countdown, press “OK” to reset the timer to “T2”. At any time during countdown, a long press (>3s) on “OK” resets the timer to “T1”.

2.12.2 Setting the race timer

The default settings are 8 minutes for ***« T1 »*** and 4 minutes for ***« T2 »***. Here is the procedure to set the timers to your own values:



2.13 Performance functions

2.13.1 Calculation of the current

The Multigraphic will automatically calculate the current when it is set as a master.

The following channels are created:

Speed of measured current (in knots).

Direction of measured current (in degrees True).

The data can be displayed on the Multigraphic.

Contrary to wind direction, which is measured as the bearing the wind is blowing from, the current's direction is measured in the direction it is travelling towards. This value is a True Heading (geographic).

The calculation of the current requires the following channels to be active:

Magnetic Heading

Magnetic Variation

Heading Over Ground

Boat speed

Drift angle

The primary sensors must be correctly calibrated to ensure reliable and accurate information.

2.13.2 True wind tables

The data measured by the wind sensor placed on top of the mast, even when on a long carbon arm, is affected by the sails.

The wind flow is disturbed around the sails and rig. This is called the "upwash".

This "upwash" affects the measured raw data measured for the calculation of the true wind direction. Therefore, the true wind direction may be different from one tack to another and the wind speed varies from upwind to downwind.

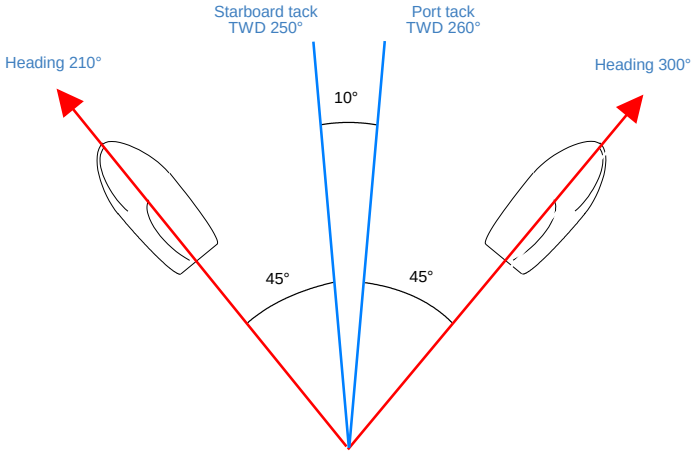
The errors due to upwash can be repeated with sail configurations and wind speed combinations making it possible to apply corrections. A correction table can be filled for true wind speed and angle.

> **Warning:**
>
> The true wind correction tables only work with the **HR or Carbowind** sensors featuring the V2.5 (or newer) firmware.

2.13.2.1 True wind angle table

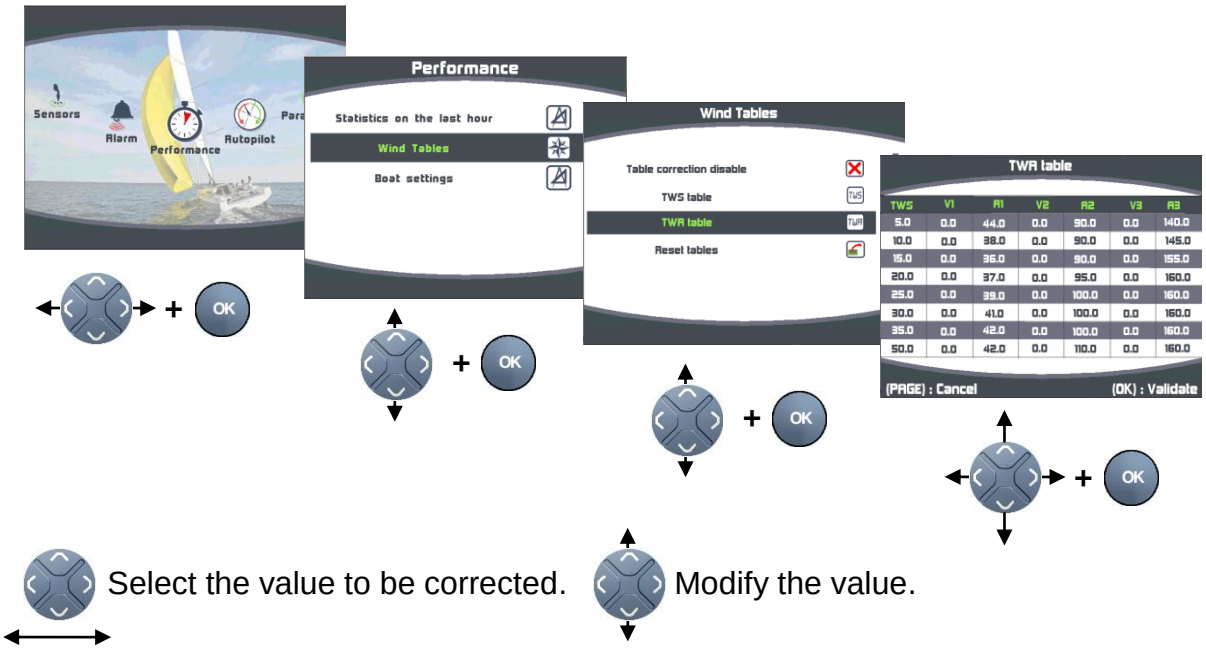
The true wind angle table allows correction of the true wind angle value without researching the causes of angle's errors. It corrects all repeatable errors (twist, flow over-speed downwind, sensor).

The true wind data is calibrated by logging the true wind direction differences from one tack to another repeatedly. It is recommended that these calibration sessions are run from 5 to 50 knots in winds that are stable in direction.



TWD port tack > TWD starboard tack:

Add half of the difference between the two True Wind Directions.



Select the value to be corrected. Modify the value.

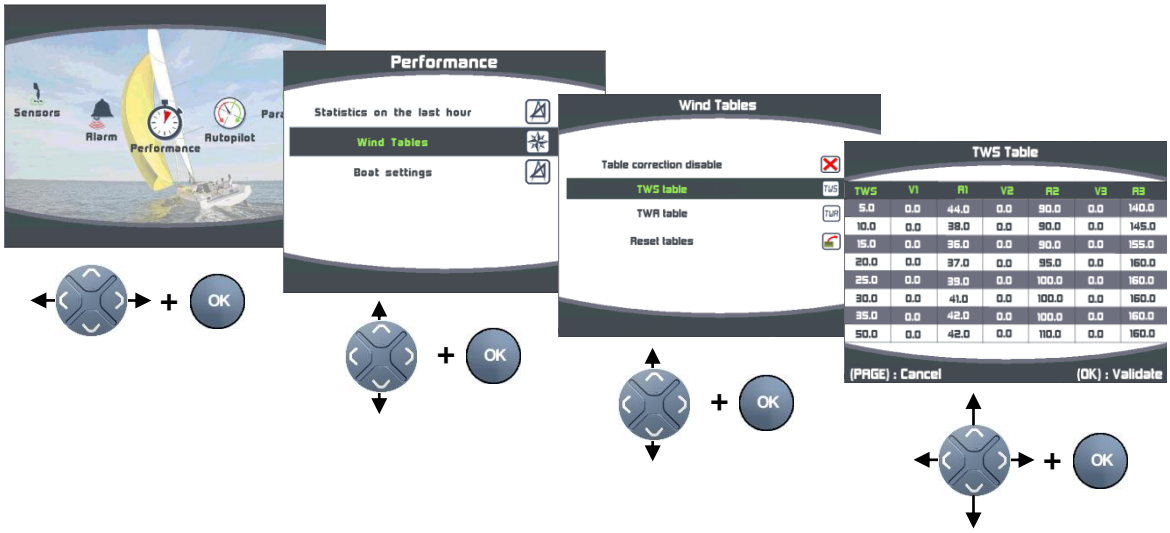
The column on the left indicates the true wind speed in knots, the "V1" column is the correction to apply in degrees and the "A1" column indicates on which angle the correction will apply. The same pattern applies for "V2" and "A2" for sidewind and "V3" "A3" for downwind.

2.13.2.2 True Wind Speed table

Even when placed one meter above the mast head on top of a carbon arm the wind sensor will measure a flow altered by the effects of the mainsail. When sailing downwind the mainsail causes an acceleration of the air flow at the mast head and when the boat is heeling the measurement of the wind will be altered. A calibration of the wind speed is required for all these reasons.

Procedure for measurement:

Hold the boat upwind at no boat speed and measure the average wind speed shown by the display. Then, while sailing at all wind angles log the wind speed shown on the displays. The average values can be used in the correction table. Always think about logging these values whenever you sail between 5 and 30 knots.

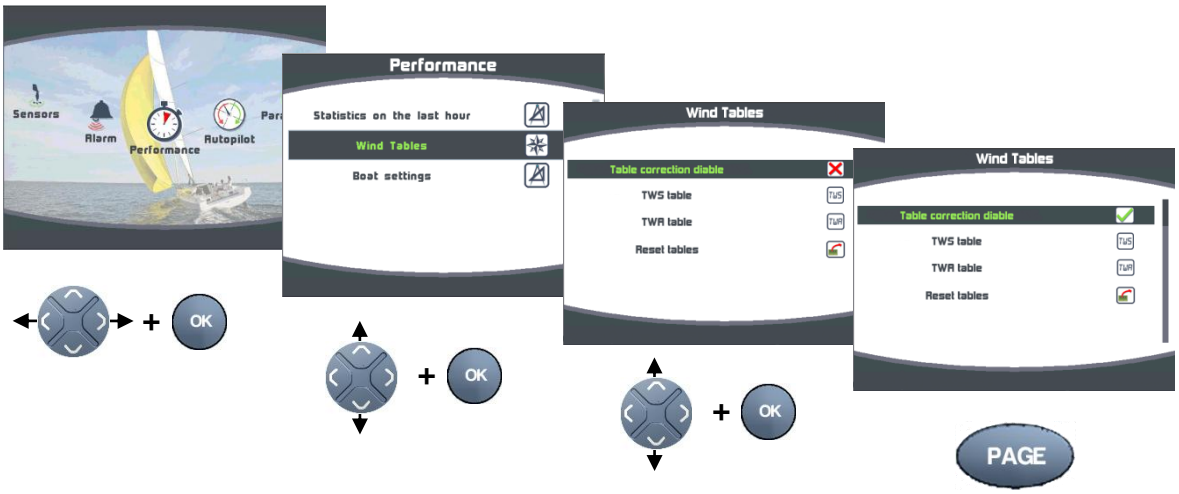


The column on the left indicates the true wind speed in knots, the “V1” column is the correction to apply in degrees and the “A1” column indicates on which angle the correction will apply. The same pattern applies for “V2” and “A2” for sidewind and “V3” “A3” for downwind.

Select the value to be corrected. Modify the value.

2.13.2.3 Activating the true wind tables

The corrections will be implemented once the true wind tables are activated.



2.13.2.4 Resetting the tables

The “RESET TABLE” command can be used at any time to reset the table to the default values.

2.13.3 Statistics for the last hour

True Wind Direction, average of the true wind direction during the past hour.

Wind shift, calculation of the true wind direction standard deviation for the past hour.

Average wind speed, average of the true wind speed data for the past hour.

Gusts, calculation of the of true wind speed standard deviation for the past hour.

Maximum Speed, maximum speed averaged on 12 seconds laps time.

2.13.4 Boat’s parameters

Enter the relevant data for increased accuracy in the Regatta page.

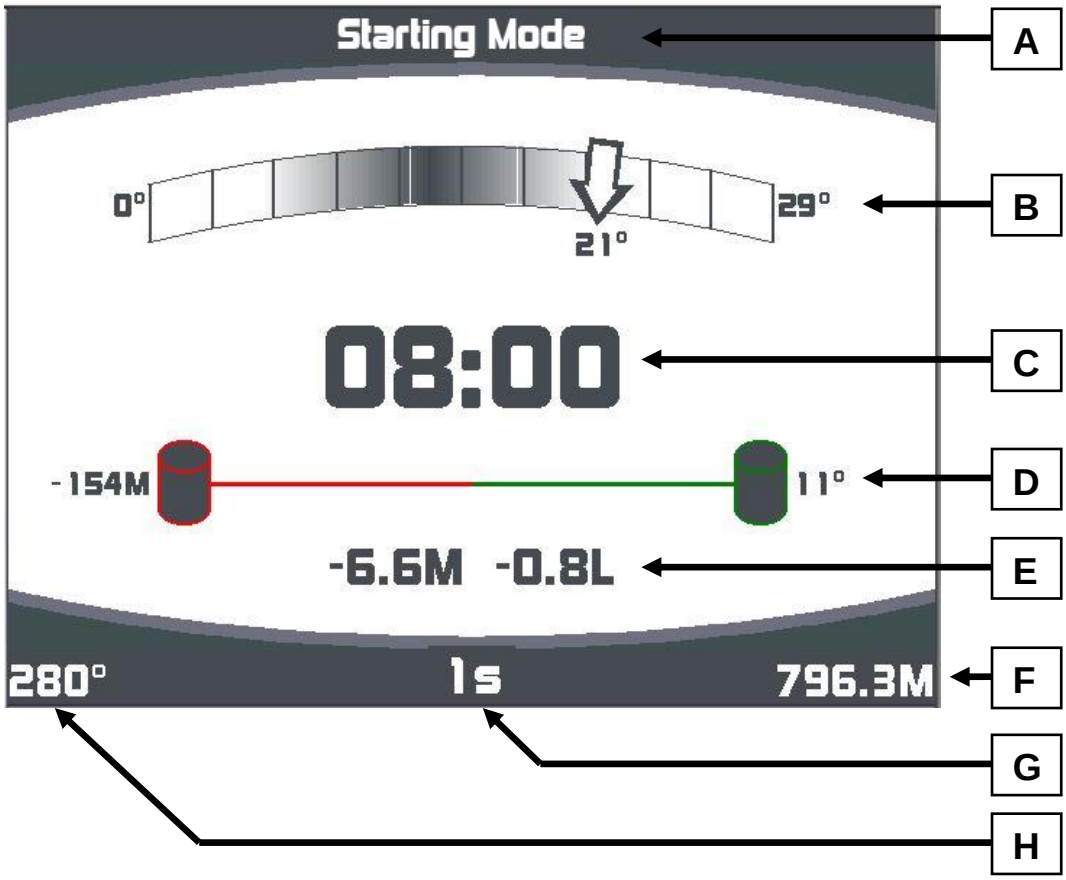
Tack Angle: enter the boat’s tack angle so the boat speed recovering after a tack can be displayed.

Boat’s size: this data is used to calculate the distance to the starting line in boat’s lengths.

GPS antenna’s distance to bow: this data is required to calculate the distance to the starting line in meters and the time to the starting line.

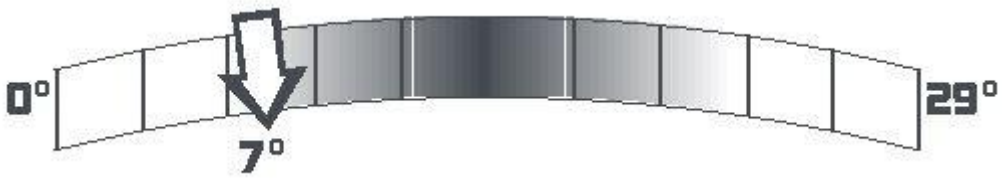
2.14 Regatta page

2.14.1 Presentation of the Regatta page



A. Starting mode screen

B. True Wind indicator



This indicator gives a quick and accurate view of the true wind direction behaviour:

- Value range
- Current value
- Average
- Values variations' standard deviation

Description of the example featured in this page:

The current wind direction is 7°magnetic, the left end is 0° and the right end is 29°.

The average value is in the centre of the colour shading which covers the extend of the standard deviation of the wind shifts.

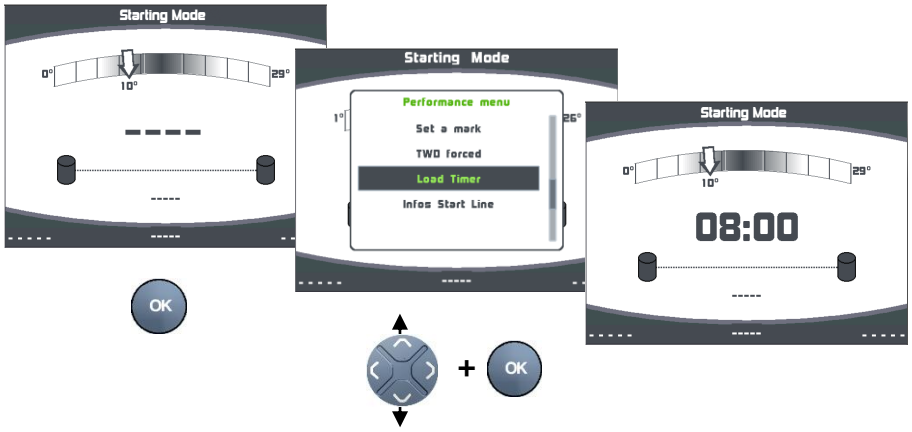
We note that:

- The shading is centred, meaning that the variations between left and right are balanced.
- The shading is spread, meaning that the wind shift range is wide (the more stable the wind the narrower the shading).
- The pointer indicates the current value. It is on the left side of the shading, meaning a wind shift to the left.
- The pointer is shown as an average shift to the left
- The pointer is at 7° on the left side, but the display shows that there have been shifts further to the left!

The data is processed for the past 5 minutes.

C. Timer

The timer can be set from the Regatta page.



A press on “OK” starts the count-down. A second press on “OK” resets the timer on T2.

Warning

The access to the Performance page is locked during the countdown from T1 to T2.

D. Start line

The committee boat is symbolized by the buoy on the right and the pin is the buoy on the left.

The favourable side is green. In this example, it is the committee boat.

16° shows the favourable angle value. In this example the wind angle to the right side of the perpendicular to the line is 16°.

By knowing the start line length, the MultiGraphic can calculate the gain to windward difference between both ends of the line.

In this example, the 16° favourable side on the committee side of the line gives a 228 meters gain to windward for a 796 meters start line. This interesting information shows that the gain to windward grows considerably with the line length and favourable angle value.

E. Distance to the line

The distance to the line is displayed in meters and boat lengths.

The value displayed is the distance between the line and the boats bow (not the GPS antenna's location). The boat's size and the distance between the GPS antenna and the bow must be entered in the system via the menu *Performance → Boat's parameters*.

F. Start line's length

This is the distance between the committee and the pin in meters.

G. Time to the line

The remaining time to the line is calculated from the speed over ground, so that the effect of the current is taken in account.

The time is displayed in seconds when it can be calculated. It is the time required for the boat to reach the line, given the current boat speed and heading.

Should boat speed or heading change, the time to the line is updated.

H. Start line orientation

This is the bearing of the pin from the committee boat side given in True degrees. The variation must be added to get the Magnetic bearing.

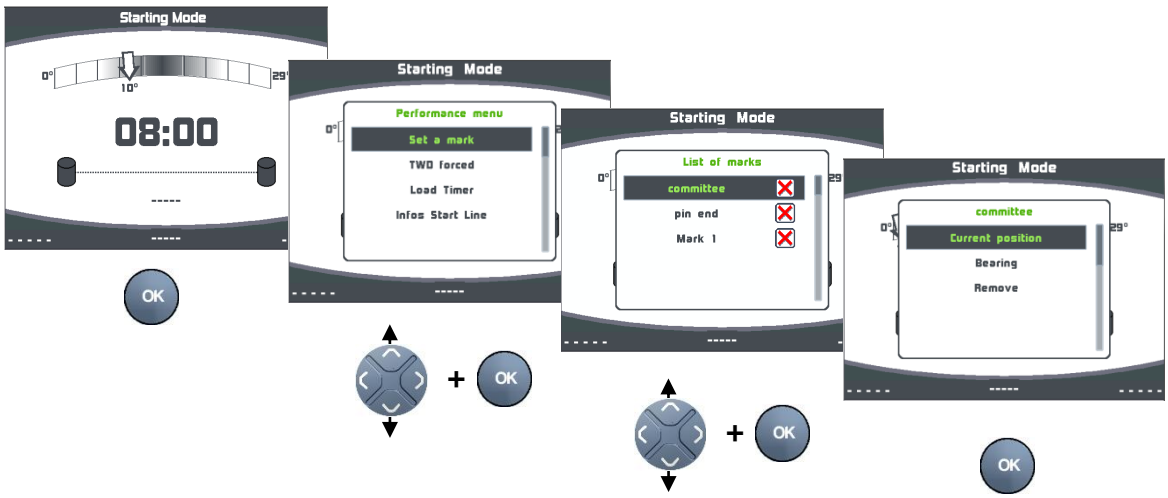
2.14.1.1 Set the start line

The start line's ends can be entered using the GPS position (antenna) or bearing and distance.

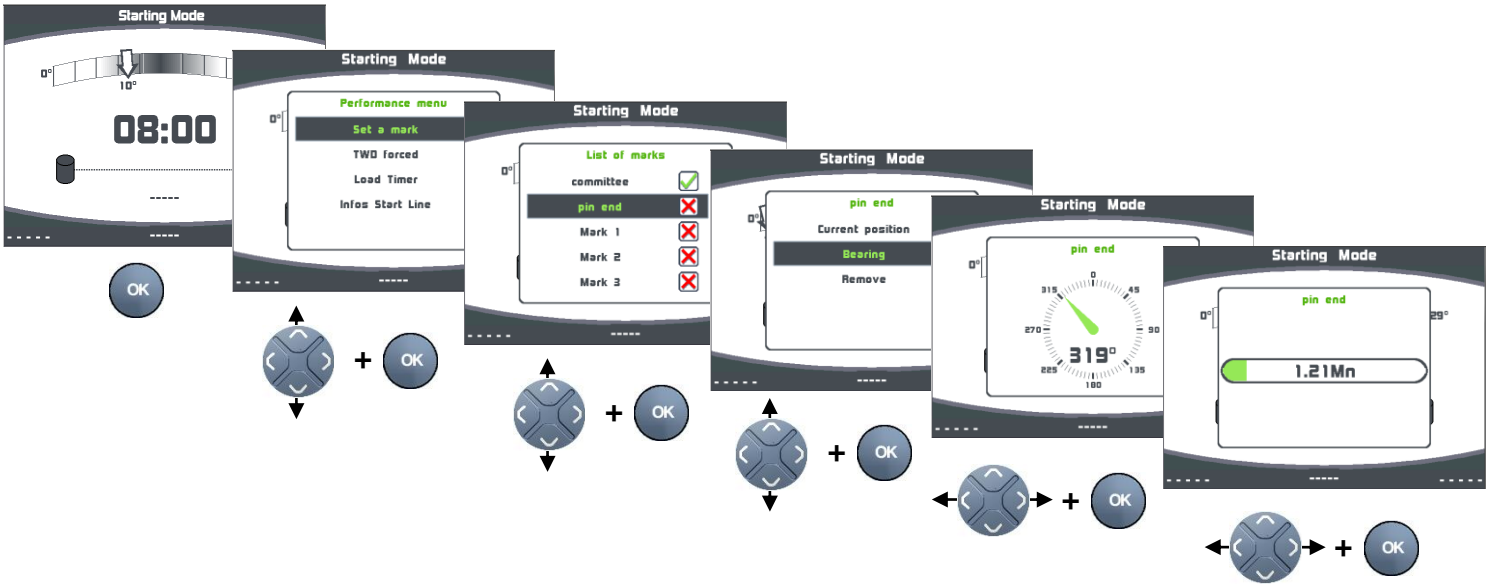
Entering the GPS position:

Sail as close as possible to the mark at low speed and validate the position when the GPS antenna matches the marks position as much as possible.

Enter a line end with GPS position

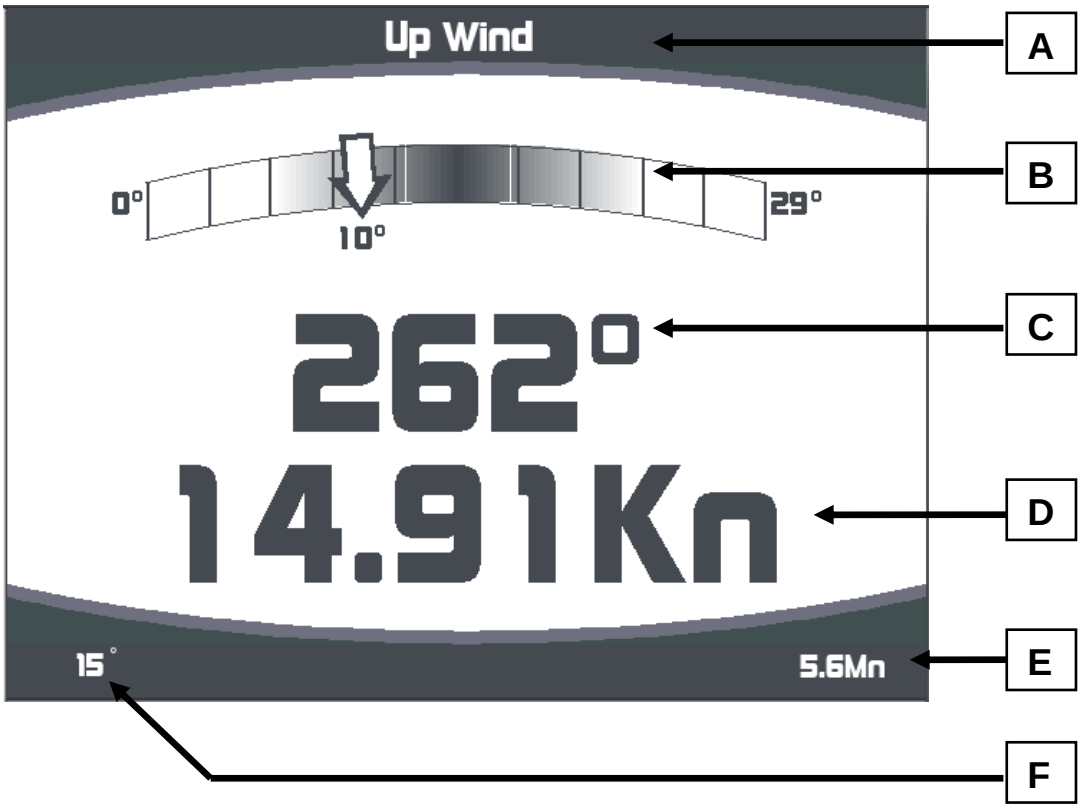


Enter a line end with bearing and distance



2.14.2 Description of the upwind screen

The upwind screen automatically displays once the racing timer countdown is over or manually with the key



A. Upwind screen

B. True wind indicator

After tacking, the true wind indicator toggles to a speed pick up indicator showing boat speed before tacking on the left and instant boat speed on the right.

C. Magnetic heading

D. Boat speed

E. Distance to the mark n°1

F. Bearing to the mark n° 1

Distance and bearing to the n°1 mark can be displayed with the distance and bearing to Waypoint channels of the Topline bus once the Multigraphic's NMEA input has been set up. The Distance and Bearing to Waypoint channels must be free (no other interface set up for the NMEA input).

2.15 Instruments calibration

2.15.1 Introduction

Accurate and realistic data requires good calibration of the sensors. Without calibration you will not get accurate data for true wind direction, true wind speed, measured drift,...

Poor calibration will produce mistakes that will affect your tactical decisions.

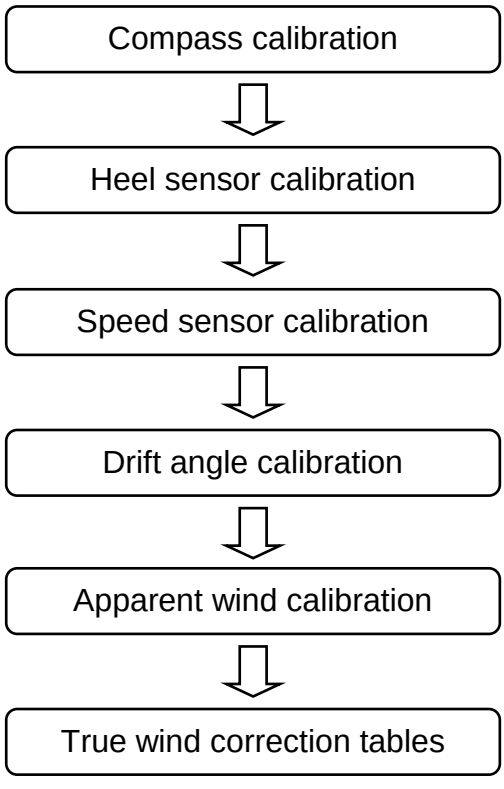
It is recommended to proceed to calibration in moderate wind conditions and steady water. Better results can be achieved when there is no current in the sailing area being used for calibration.

2.15.2 Calibrations order

Check and calibrate the primary sensors before filling the true wind correction tables:

- Compass
- Speed sensor
- Heel angle sensor

Here is the order in which the primary sensors need calibration:



For sensor calibration, see the "Sensors setting" section.

3 INSTALLATION

This section describes the installation and configuration of the ***Multigraphic*** as well as setting the parameters for an installation with a ***Gyropilot 2 processor***. Refer to the ***Gyropilot 2*** manual for the full pilot installation (drive unit, processor, rudder feed-back…).

Warning:

- Please take time to read this manual carefully before you start installation
- Any connection to the ***TOPLINE bus*** must be performed through the specific interface box # 90-60-417 (featuring an NMEA port) which comes with the ***Multigraphic***.
- Use only with the ***TOPLINE bus*** cable # 20-61-001.
- All ***Topline*** bus connections must be performed while the system is powered off.

3.1 Packing list. The Multigraphic comes with:

- A ***Multigraphic*** with six metres cable, featuring ***TOPLINE bus*** and an NMEA port.
- A user manual.
- A white sun cover: 72-60-068-000
- A fixing bolt
- A TOPLINE connection box with a NMEA port : 90-60-417

3.2 Suggested spare parts list

- TOPLINE bus standard junction box: 90-60-121
- TOPLINE connection box with a NMEA port : 90-60-417
- White sun cover: 72-60-068-000

3.3 Before installing check

The best location for the unit must be:

- Easy for the helmsman to read and operate,
- Safe location with low risk of shocks,
- More than 40 cm from a compass,
- Not horizontal.

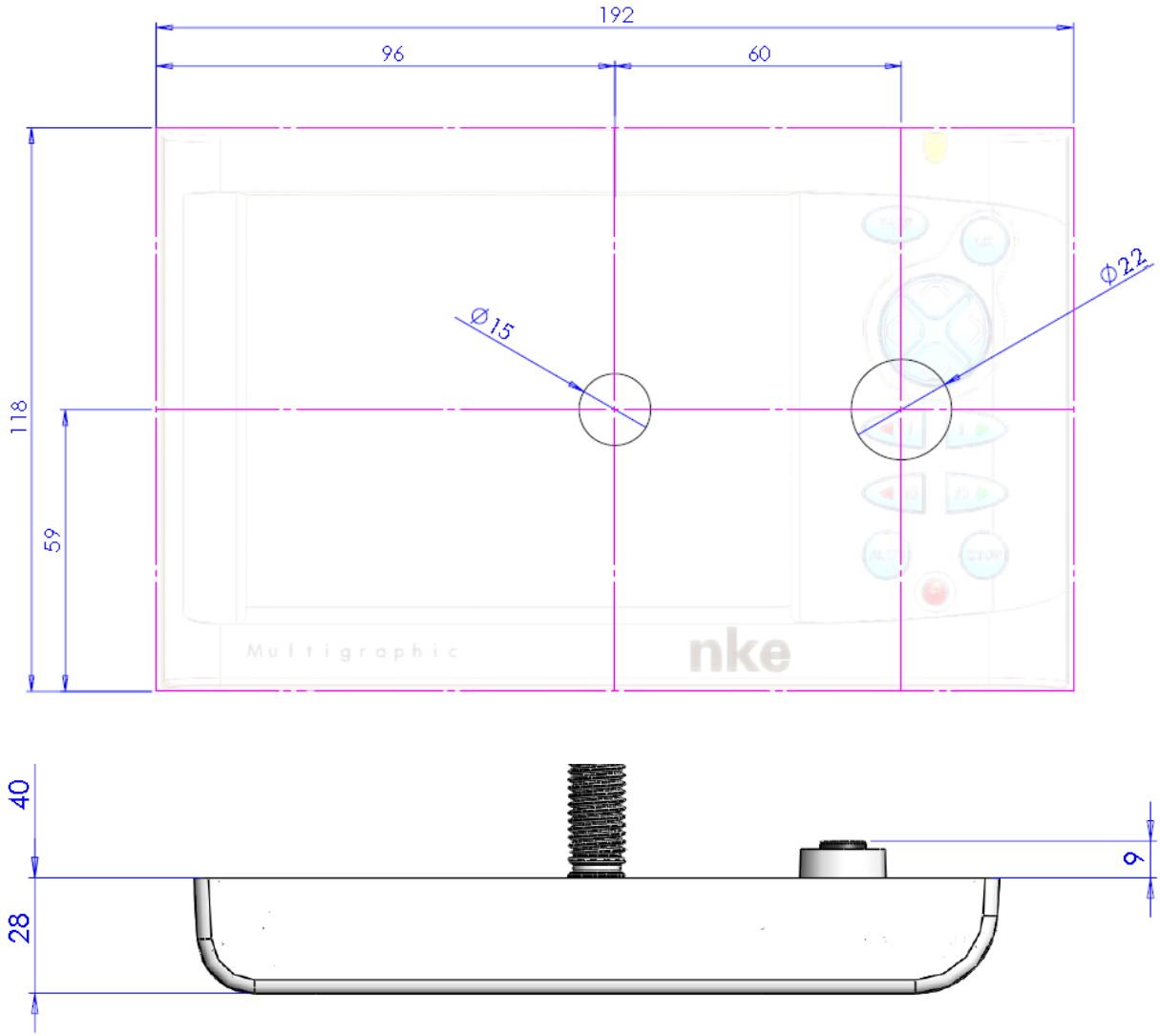
3.4 Bulkhead installation

Check that the surface is clean, flat and straight. There must be enough space on the other side to run the cable.

- Drill at ∅15 and Ø22 according to the drawing below,
- Clean the surface with alcohol.
- Use a silicone on the fixation perimeter
- Pull the cable through the ∅22 mm hole,
- Place the display and hand bolt.

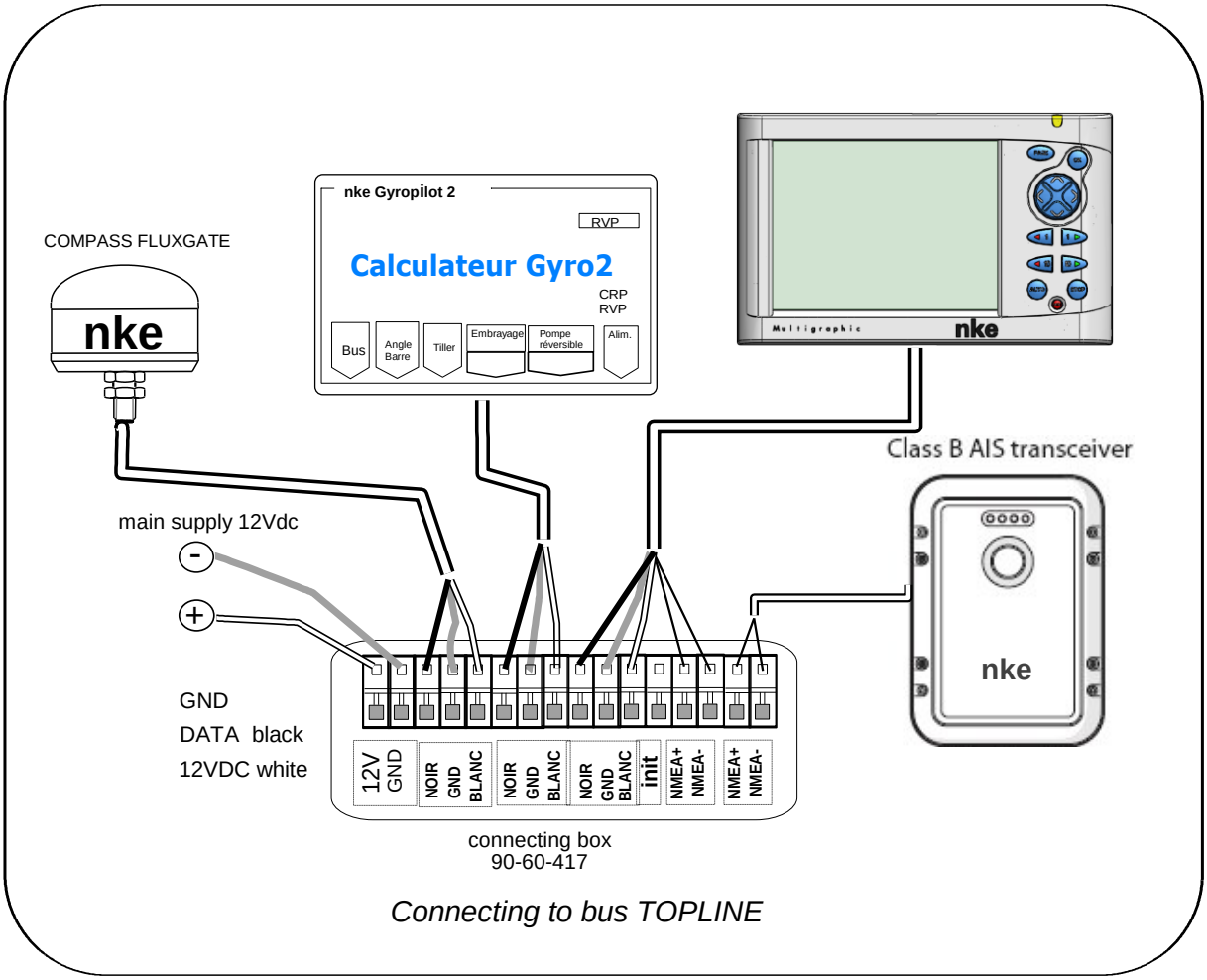
Warning:

- When you fix the display, gently tighten the bolt by hand. Over tightening may damage the housing and cause a leak.
- Do not use a sealant to fix the display.



3.5 Connection to the *Topline* bus and NMEA

1. Run the bus cable from the ***Gyropilot Graphic*** to the ***TOPLINE*** junction of your system.
2. Connect the cable in the junction box.



Connecting to bus TOPLINE

Should you want to cut the bus cable to length, uncover and tin the wires before connecting them.

Cable colour code

White cable / 5 wires	functions	
white	+12V	***TOPLINE bus***
black	Data ***Topline***	
braid	commun	
red	Not connected	
yellow	NMEA +	NMEA input
green	NMEA –	

3.6 Node address for the *Multigraphic*

At the first power on, you must give a node address to the ***Multigraphic*** to enable it to work on the system's bus.

The default address is **0**.

When the unit is given an address it will take a place in the system to be listed in the units working on the ***TOPLINE bus***:

- As a master with node **1**, if it is available on the bus,
- As a slave with node **2** to **20** if node 1 is already taken by an existing master.

Refer to section 2.7.5.1 to see the address procedure.

Refer to section 2.7.5.1 for address resetting.

3.7 Connecting to a NMEA source and configuration

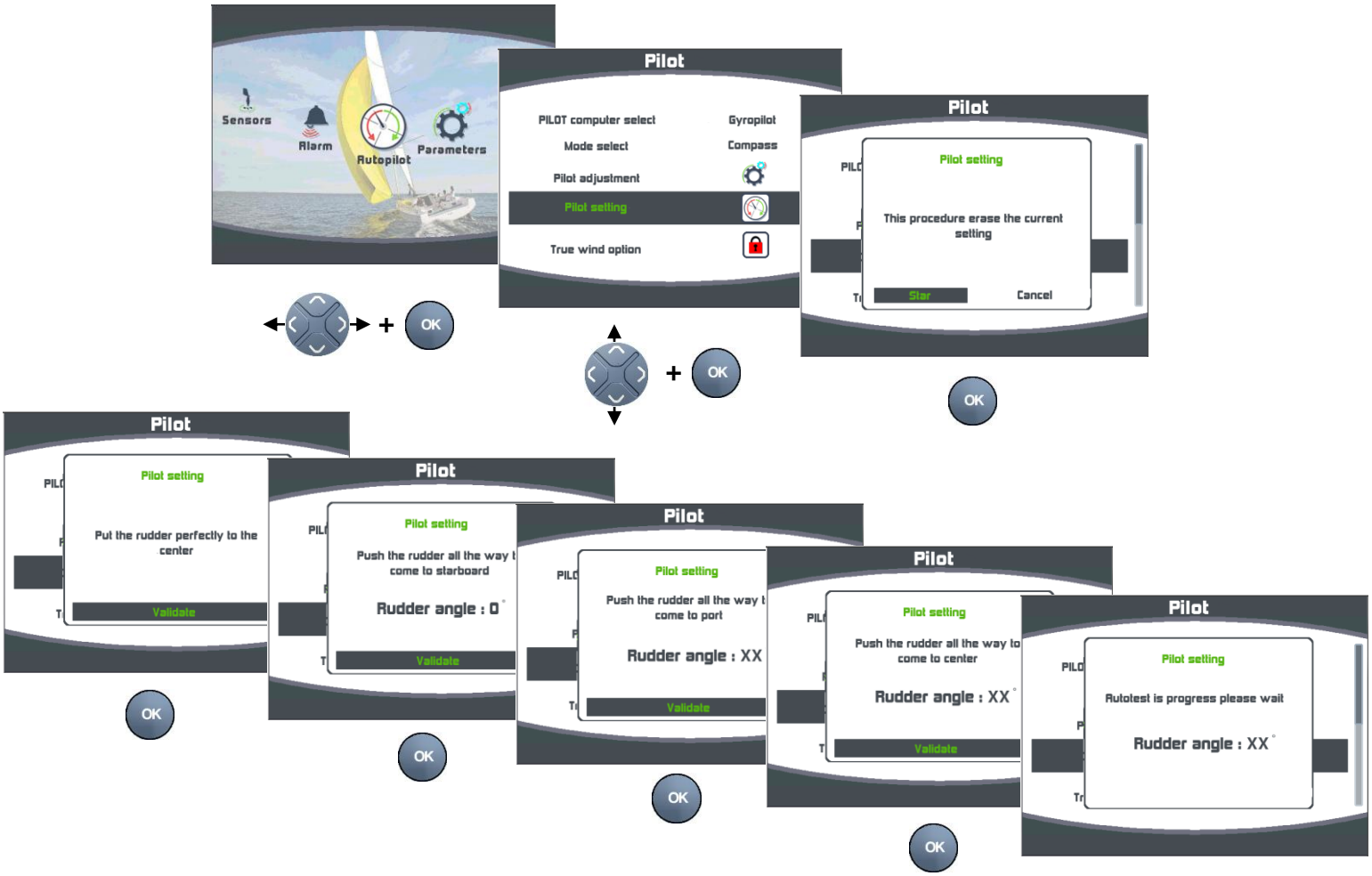
The ***Multigraphic*** features an interface which converts ***NMEA*** sentences to the ***Topline*** protocol. This allows the system to display the data coming from a NMEA source on the ***nke*** displays.

Connect the ***NMEA*** device to the NMEA- and NMEA+ terminals of the 90-60-417 junction box. Be careful to respect the polarity (refer to the connection drawing). The configuration is described in the section 2.7.5.2.2 of this manual.

3.8 Installation and configuration of the Gyropilot

Once the ***Gyropilot*** is installed, you need to configure the system. This consists of teaching the pilot the rudder's positions: place the rudder in the midship position, then at the starboard lock and then the port lock. These three rudder positions are essential for the processor to run the drive unit.

Procedure:



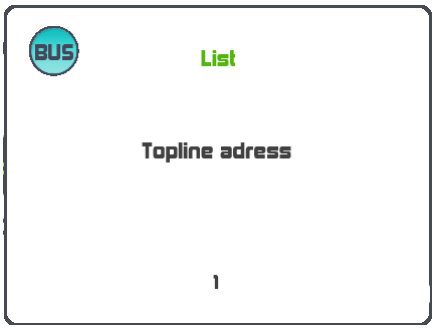
Warning

The Gyropilot can only perform the automatic tack if the rudder ends are perfectly symmetrical. While setting the rudder ends, check that this is the case. Port lock to midship and starboard lock to midship must be the same.

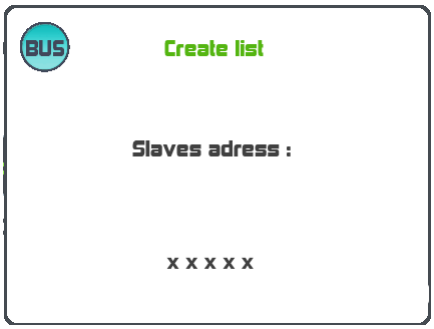
4 MULTIGRAPHIC SPECIFICATIONS

Feature	Value
Dimensions	With sun cover: 196 x 122 x 28mm (length x height x depth) Without sun cover: 192 x 118 x 23mm ((length x height x depth)
Weight	800 g (with 6 m cable and sun cover)
Power supply	8V – 32V DC
Consumption at 12 Volts	Day backlight: Level 1 = 100mA Level 20 = 180 mA night backlight: Level 1 = 100mA Level 20 = 120mA Standby: 91mA
NMEA input	NMEA 183, baud rate configurable automatically from 4800 or 38400 bauds. AIS direct data acquisition.
Environment	Protection IP 68 (waterproof at permanent immersion and to high pressure water flow) Operation temperature -20°C - +50°C Storage temperature -20°C - +60°C
Power supply cable	Ø 5.5 mm, 4 wires + braid, length 6m.
Display	5.7’’ colour graphic screen, translective, embedded LED backlight.

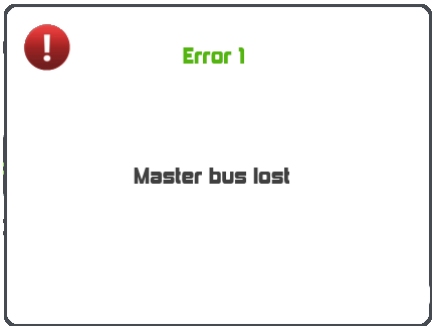
5 EVENTS MESSAGES



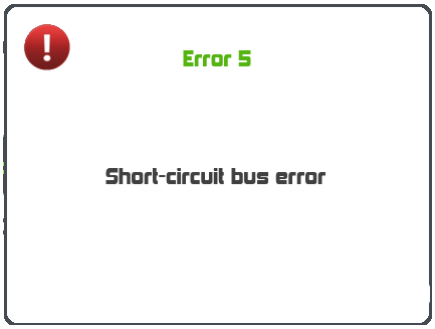
Message at system start up, indicating the Multigraphic address.



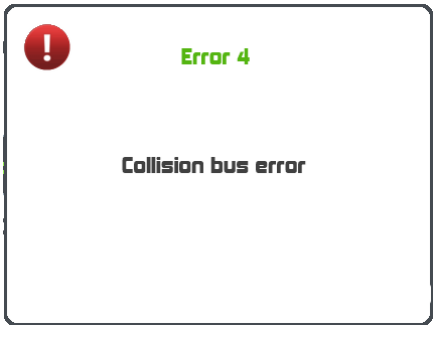
Multigraphic being set as “Master”, when the system creates the list (search all sensors and displays in the bus), it displays addresses for slave displays.



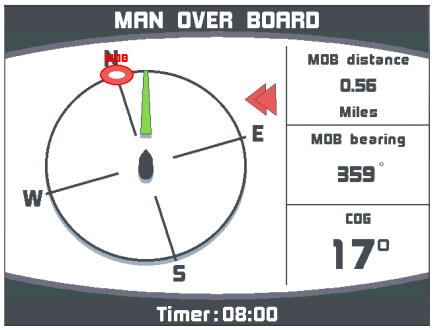
The “master” display is unplugged or out of order. This can be solved by replacing the “master” display by another one. (Refer to “Toplines addresses” section).



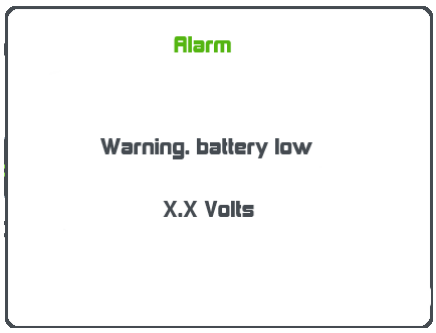
The black wire of the Topline bus cable, carrying the data is in short-circuit with one of the 2 other wires. This can happen in a junction box, the cable itself or one of the units connected to the bus.



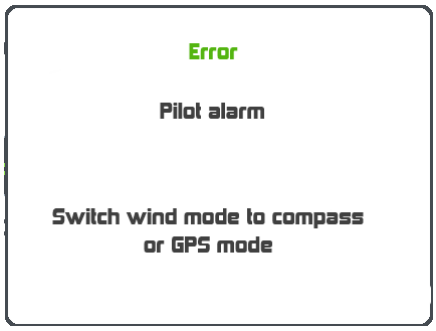
2 similar sensors are connected to the bus and transmit the same data, or an NMEA input has been set for the same data as a sensor present in the bus. Check the connected sensors and reset the NMEA inputs.



This page is shown when the Man Over Board function has been triggered. The **dead reckoned** distance and bearing to the man over board are displayed together with the boat's course over ground. The timer is triggered to give the time from event.



This message displays when the power supply to the Topline bus is below 9 Volts. Data is saved and the system switches off. Check the battery level and eventually charge it.



With the pilot in wind mode when an alarm has been set and the apparent wind angle is over the defined range. Press any key to inhibit the alarm for 7 minutes

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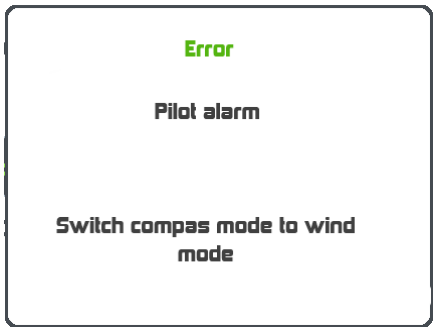
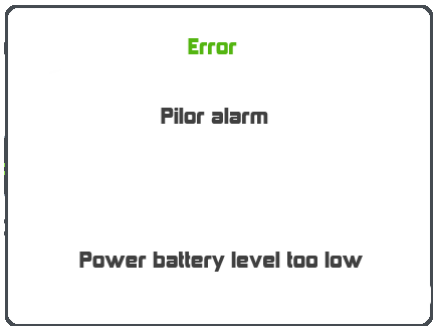


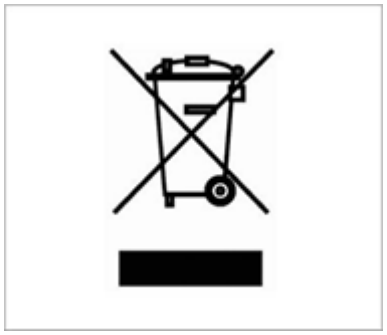
When the pilot in compass mode and an alarm has been set this will be displayed when the compass heading is over the defined range. Press any key to inhibit the alarm for 7 minutes.



The battery powering the pilot's drive unit has reached a lower voltage than defined in the setup. Press any key to inhibit the alarm for 7 minutes.

WARNING: THIS ALARM IS ALWAYS ACTIVATED.

Charge the battery.



YOU CAN HELP PROTECT THE ENVIRONMENT!
Please remember to respect the local regulations:
Hand in the non-working electrical equipment
to an appropriate waste disposal center.